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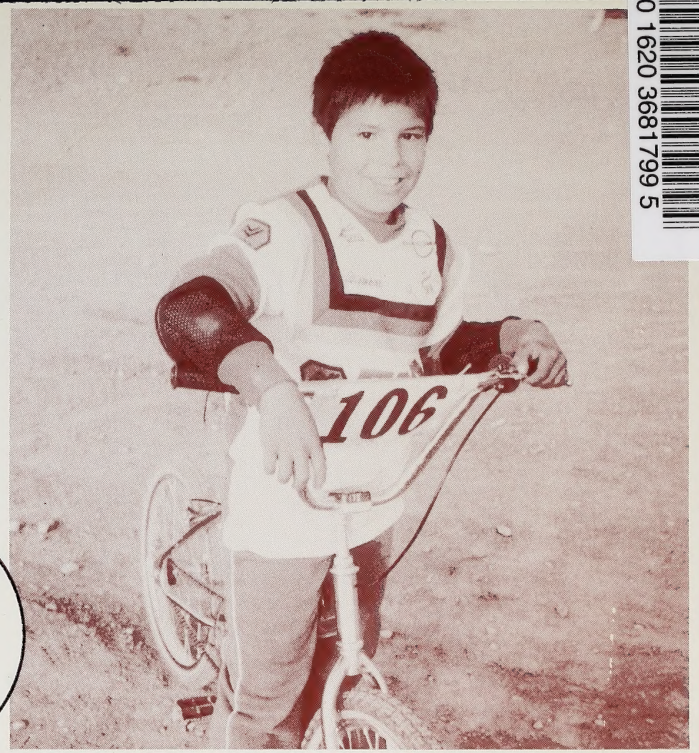
WHOLE NUMBERS and INTEGERS

MODULE 2

LEARNING FACILITATOR'S MANUAL



MATHEMATICS 7

Distance Learning

Alberta EDUCATION

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Mathematics 7

Module 2: Whole Numbers and Integers

LEARNING FACILITATOR'S MANUAL

Note

This Mathematics Learning Facilitator's Manual contains answers to teacher-assessed assignments and the final test; therefore, it should be kept secure by the teacher. Students should not have access to these assignments or the final tests until they are assigned in a supervised situation. The answers should be stored securely by the teacher at all times.

Mathematics 7
Learning Facilitator's Manual
Module 2
Whole Numbers and Integers
Alberta Distance Learning Centre
ISBN No. 0-7741-0128-8

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MODULE INTRODUCTION

What Lies Ahead

In this module students will be working with whole numbers and integers.

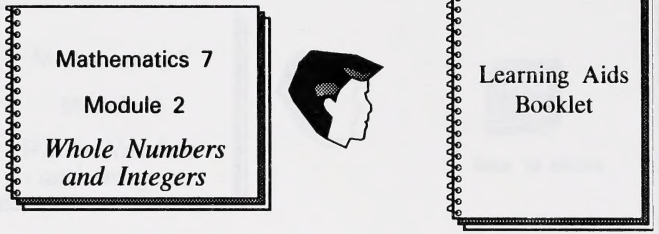
Part One (Sections 1-13) deals with the background skills needed for the module.

Part Two (Sections 14-20) deals with mental computation and order of operations.

Part Three (Sections 21-30) deals with multiples, factors, powers, and integers.

Gathering Materials

The student will need the following items for the introduction.



Guiding the Student

- Have the student preview the module booklet and *Learning Aids Booklet* for Module 2 and then have the student read the Module Introduction in the module booklet.
- Next discuss the learning process, time management, and evaluation with the student. (See the suggestions on the next page of this booklet.)

The Learning Process

Each section of Module 2 deals with a different skill involving whole numbers or integers.

Sections have several activities.

- Learning Aids Activities or Introductory Activities
- Practice Activities
- Extra Practice
- Concluding Activities

Remind the student that he/she will not be expected to do all the activities. You will help him/her decide what to do.

Time Management

Decide how long the student will need to complete the module. (The average student should spend about 9 weeks or 22.5 hours to complete the module. It is recommended that students spend no more than 1 hour at a time doing mathematics.)

Evaluation

Explain that the grade on Module 2 is based on work in the assignment booklet. The module booklet will help prepare the student for the assignment booklet.

GETTING SET

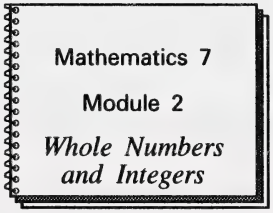
What Lies Ahead

In this section the student will review these skills.

- reading and writing whole numbers
- comparing and ordering whole numbers
- rounding whole numbers
- adding, subtracting, multiplying, and dividing whole numbers
- estimating
- computing answers using paper and pencil and a calculator
- checking the reasonableness and accuracy of computations

Gathering Materials

For this section the student will need the following items.



Base 10 Blocks

Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" of Section 1 in the module booklet.
- Next have the student do the Pretest.
- Afterwards help the student check the answers. Suggested answers are on the next page of this booklet. It is **not** necessary for the student to correct errors at this time. See page 16 for further directions.

Pretest

1. Express in expanded form.

   a. 2 984

   b. 30 278

   c. 2 360 585

2. Express in standard form.

   a. 8 000 + 300 + 40 + 7

   b. (1 × 100 000) + (3 × 10 000) + (8 × 100) + (2 × 1)

   c. five hundred ninety

   d. three million seventy-six thousand two hundred eighty-eight

Suggested Answers

1. a. (2 × 1000) + (9 × 100) + (8 × 10) + (4 × 1)

   b. (3 × 10 000) + (2 × 100) + (7 × 10) + (8 × 1)

   c. (2 × 1 000 000) + (3 × 100 000) + (6 × 10 000) + (5 × 100) + (8 × 10) + (5 × 1)

2. a. 8 347

   b. 130 802

   c. 590

   d. 3 076 288

3. Write in words.

   a. 1 024

   b. 13 545 600

4. Order from greatest to least.

   a. 19, 911, 91, 191, 90

   b. 1234, 3421, 3241, 4321, 1423

5. Tell whether the numbers are exact or rounded.

   a. The bird survey recorded over 1800 warblers.

   b. Edmonton has about 600 000 people.

   c. August has thirty-one days.

3. a. One thousand twenty-four

   b. Thirteen million five hundred forty-five thousand six hundred

4. a. 911, 191, 91, 90, 19

   b. 4321, 3421, 3241, 1423, 1234

5. a. rounded

   b. rounded

   c. exact

Words such as *over* and *about* indicate a rounded number.

6. Complete.

		Rounded to the nearest		
		ten	hundred	thousand
a.	879	880	900	1 000
b.	8 528	8 530	8 500	9 000
c.	94 846	94 850	94 800	95 000

7. Estimate.

a.
$$\begin{array}{r} 64 \\ +\ 29 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 52\,876 \\ +\ 8\,093 \\ \hline \end{array}$$

c. $94 - 37$

d.
$$\begin{array}{r} 187\,201 \\ -\ 88\,193 \\ \hline \end{array}$$

7. Answers will vary depending on method.

	Rounding	Front-end Digits
a.	$\begin{array}{r} 60 \\ +\ 30 \\ \hline 90 \end{array}$	$\begin{array}{r} 60 \\ +\ 20 \\ \hline 80 \end{array}$
b.	$\begin{array}{r} 53\,000 \\ +\ 8\,000 \\ \hline 61\,000 \end{array}$	$\begin{array}{r} 52\,000 \\ +\ 8\,000 \\ \hline 60\,000 \end{array}$
c.	$\begin{array}{r} 90 \\ -\ 40 \\ \hline 50 \end{array}$	$\begin{array}{r} 90 \\ -\ 30 \\ \hline 60 \end{array}$
d.	$\begin{array}{r} 190\,000 \\ -\ 90\,000 \\ \hline 100\,000 \end{array}$	$\begin{array}{r} 180\,000 \\ -\ 80\,000 \\ \hline 100\,000 \end{array}$

e.
$$\begin{array}{r} 28 \\ \times\ 19 \\ \hline \end{array}$$

f. 307×68

g. $7\overline{)33310}$

h. $4233 \div 63$

	Rounding	Front-end Digits
e.	$\begin{array}{r} 30 \\ \times\ 20 \\ \hline 600 \end{array}$	$\begin{array}{r} 20 \\ \times\ 10 \\ \hline 200 \end{array}$

	Rounding	Front-end Method
f.	$\begin{array}{r} 300 \\ \times\ 70 \\ \hline 21\,000 \end{array}$	$\begin{array}{r} 300 \\ \times\ 60 \\ \hline 18\,000 \end{array}$

g. $30\,000 \div 10 = 3000$ $33\,000 \div 7 \doteq 4000$

h. $4200 \div 60 = 70$ $4000 \div 60 \doteq 60$

8. Model the following using base 10 blocks.

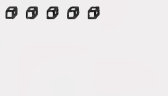
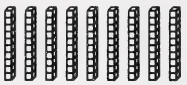
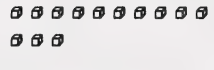
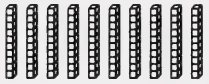
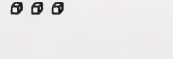
a. 65 + 38

Step 1. Form the numbers.

Step 2. Combine the pieces.

Step 3. Trade 10 units for 1 long.

Step 4. Trade 10 longs for 1 flat.

Flats	Longs	Units
		
		
		

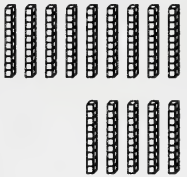
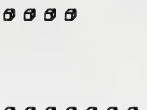
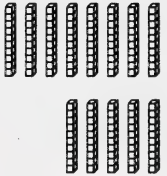
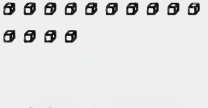
Step 5. Write the number sentence. 65 + 38 = 103

8. b. 94 – 57

Step 1. Form the numbers.

Step 2. Trade 1 long for 10 units because you cannot take away 7 units from 4 units.

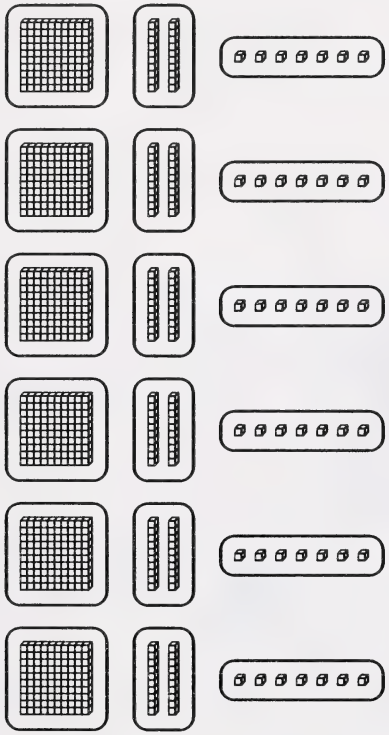
Step 3. Take away the required pieces.

Flats	Longs	Units
		
		

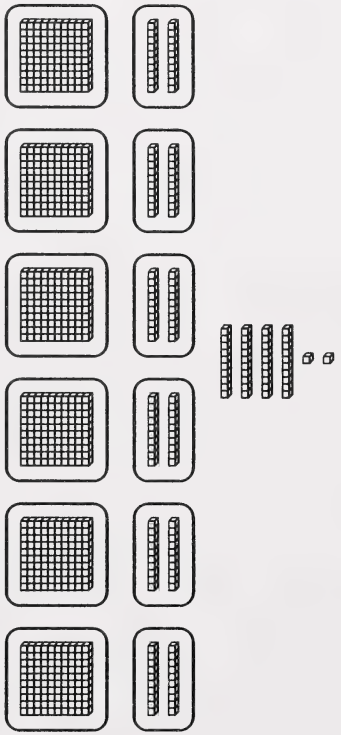
Step 4. Write the number sentence. 94 – 57 = 37

8. c. $127 \times 6 = 100 \times 6 + 20 \times 6 + 7 \times 6$

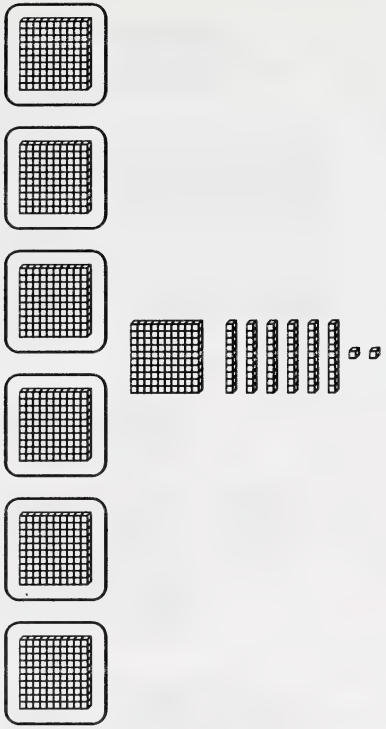
Step 1. Form 6 groups of 100, 6 groups of 20, and 6 groups of 7.



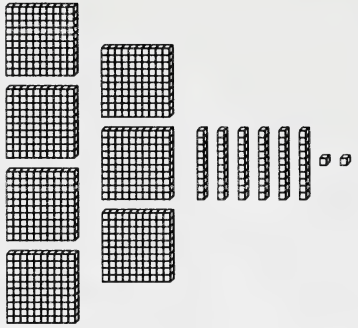
Step 2. Begin with 6 groups of 7 units. Trade 40 units for 4 longs. There are 2 units left.



Step 3. Next consider 6 groups of 2 longs. Trade 10 longs for 1 flat. There are 6 longs left over.



Step 4. Now consider 6 groups of 1 flat. There are 7 flats altogether.



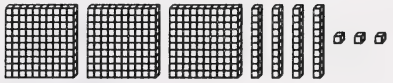
Step 5. Write the number sentence.

$127 \times 6 = 762$

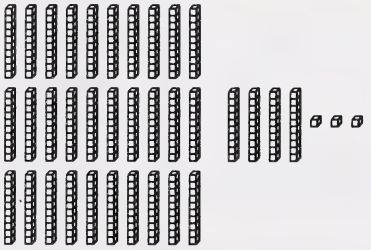
8. d. 343 ÷ 7

Step 1. Think about the meaning of division. 343 ÷ 7 can mean "in 343 there are 7 groups of how many?"

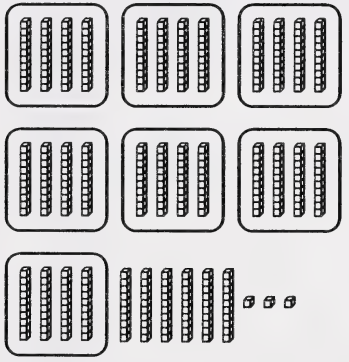
Step 2. Form 343.



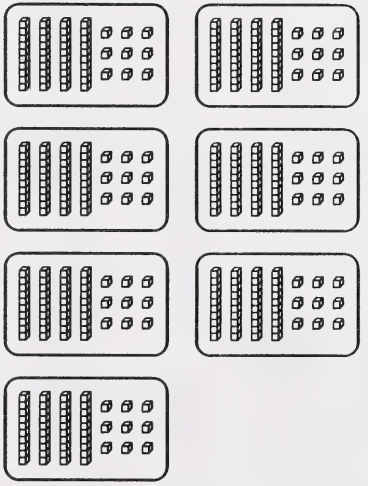
Step 3. Try to group the pieces into 7 groups. You cannot, so trade 3 flats for 30 longs.



Step 4. Arrange the longs into 7 groups.



Step 5. Trade 6 longs for 60 units. Then group the 63 units into 7 groups of 9.



Step 6. Write the number sentence. 343 ÷ 7 = 49

9. Compute the following. Do **not** use a calculator.

a. 65 + 38

b.
$$\begin{array}{r} 53\,786 \\ +\ 8\,094 \\ \hline \end{array}$$

c. 94 − 57

d.
$$\begin{array}{r} 188\,203 \\ -\ 77\,192 \\ \hline \end{array}$$

e. 27 × 6

f.
$$\begin{array}{r} 586 \\ \times\ 32 \\ \hline \end{array}$$

g. $7\overline{)343}$

h. 4395 ÷ 63

9. a.
$$\begin{array}{r} 65 \\ +\ 38 \\ \hline 103 \end{array}$$

b.
$$\begin{array}{r} 53\,786 \\ +\ 8\,094 \\ \hline 61\,880 \end{array}$$

c.
$$\begin{array}{r} 94 \\ -\ 57 \\ \hline 37 \end{array}$$

d.
$$\begin{array}{r} 188\,203 \\ -\ 77\,192 \\ \hline 111\,011 \end{array}$$

e.
$$\begin{array}{r} 27 \\ \times\ 6 \\ \hline 162 \end{array}$$

f.
$$\begin{array}{r} 586 \\ \times\ 32 \\ \hline 1\,172 \\ 17\,58 \\ \hline 18\,752 \end{array}$$

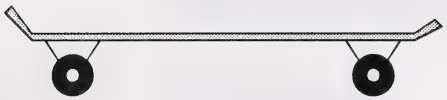
g.
$$\begin{array}{r} 49 \\ 7\overline{)343} \\ 28 \\ \hline 63 \\ 63 \\ \hline 0 \end{array}$$

h.
$$\begin{array}{r} 69\ \text{R48} \\ 63\overline{)4395} \\ 378 \\ \hline 615 \\ 567 \\ \hline 48 \end{array}$$

Use a calculator in Questions 10-12.

10. a. What is the total cost of the skateboard?

    b. How much change is left from $200?



Deck	$88	Trucks	$34
Wheels	$42	Bearings and tape	$ 8

10. a.

Key Press	Display
8 8	88
+ 4 2	42
+ 3 4	34
+ 8	8
=	172

The total cost is $172.

b.

Key Press	Display
2 0 0	200
− 1 7 2	172
=	28

There is $28 left.

11. Gloria's heart beats an average of 69 times in one minute. How many times does it beat in one hour?

12. The Petersons travelled 570 km in 6 hours on the first day of their vacation. Find the distance travelled in one hour.

11. 1h = 60 min

Key Press	Display
6 9	69
× 6 0	60
=	4 140

Gloria's heart beats 4140 times in 1h.

12.

Key Press	Display
5 7 0	570
÷ 6	6
=	95

The Petersons travelled 95 km in one hour.

Guiding the Student

After checking the answers, compare the student's results with the following chart. (The chart lists the skills covered in the Pretest and the section in which the skill will be taught.)

Question	Skill	Section
1, 2, 3	Reading and writing whole numbers	2
4	Comparing and ordering whole numbers	3
5, 6	Rounding whole numbers	4
7a, 7b	Estimating sums	5
7c, 7d	Estimating differences	6
7e, 7f	Estimating products	7
7g, 7h	Estimating quotients	8
8s, 9a, 9b, 10a	Finding sums of whole numbers	9
8b, 9b, 9d, 10b	Finding differences of whole numbers	10
8c, 9c, 9f, 11	Finding products of whole numbers	11
8d, 9g, 9h, 12	Finding quotients of whole numbers	12

Help the student to decide what to do next. It is recommended that the student does most of the sections which correspond to the questions with which the student experienced difficulties and only the concluding activities in sections which correspond to the questions with which the student experienced success.

READING AND WRITING WHOLE NUMBERS

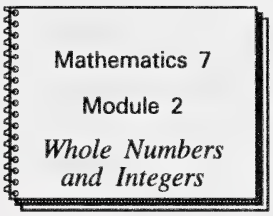
What Lies Ahead

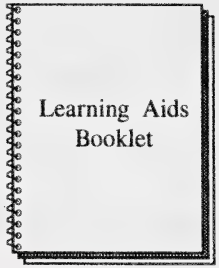
In this section the student will learn these skills.

- identifying place value in whole numbers
- reading and writing whole numbers in standard form
- writing whole numbers in expanded form
- reading and writing whole numbers in words

Gathering Materials

For this section the student will need these items.





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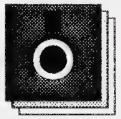


(Optional)

Computer Drill and Instruction: Mathematics, Level D (SRA)

dictionary or encyclopedia

Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" of Section 2 of the module booklet.
- Next have the student do the Learning Aids Activities (Exercise A in the *Learning Aids Booklet*) and check the answers. Suggested answers are in the appendix of that booklet.
- After the student has completed the Learning Aids Activities, have the student return to Section 2 in the module booklet and read "Working Together" and do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

Practice Activities

Computer Alternative

1. Do Lessons 1, 3, 4 of the disk "Numbers and Numeration" from the package, *Computer Drill and Instruction: Mathematics,* Level D (SRA).

   Read the instructions in the folder with the disk before using the program. If you need help, remember to hold down the SHIFT key and press the ? key.

Print Alternative

2. Express in standard form.

   a. 60 000 + 8000 + 500 + 30 + 4

   b. 900 000 + 50 000 + 6000 + 300 + 2

   c. (5 × 100 000) + (3 × 10 000) + (7 × 1000) + (9 × 100) + (2 × 10)

   d. (9 × 1 000 000) + (8 × 100 000) + (5 × 10 000) + (4 × 1000)

   e. (7 × 100 000) + (6 × 10 000) + (3 × 100) + (6 × 1)

Suggested Answers

1. Computer checked.

2. a. 68 534

   b. 956 302

   c. 537 920

   d. 9 854 000

   e. 760 306

3. Express in expanded form.

a. 98 100

b. 50 543

c. 73 725

d. 3 140 000

e. 80 500 000

4. Write in word form.

a. 98 100

b. 6853

c. 7062

3. a. $(9 \times 10) + (8 \times 1000) + (1 \times 100)$

b. $(5 \times 10000) + (5 \times 100) + (4 \times 10) + (3 \times 1)$

c. $(7 \times 10000) + (3 \times 1000) + (7 \times 100) + (2 \times 10) + (5 \times 1)$

d. $(3 \times 1000000) + (1 \times 100000) + (4 \times 10000)$

e. $(8 \times 10000000) + (5 \times 100000)$

4. a. Ninety-eight thousand one hundred

b. Six thousand eight hundred fifty-three

c. Seven thousand sixty-two

5. Write in standard form.

a. seventy-five thousand one

b. six thousand seventy-five

c. one million eight hundred five

5. a. 75 001

b. 6 075

c. 1 000 805

Guiding the Student

- Have the student do the Concluding Activities. A dictionary or encyclopedia may be helpful.
- Afterward help the student check the answers and correct any errors. Suggested answers are on the following page.

Note

It is expected that the student may have some difficulties with the Concluding Activities. This will not affect the student's progress. These activities are designed to extend or enrich the ideas presented in this section.

Concluding Activities

Do you like big numbers? The chart below shows the names of the periods of a very large number.

decillions	nonillions	octillions	septillions	sextillions	quintillions	quadrillions	trillions	billions	millions	thousands	units
123	456	789	012	345	678	901	234	567	890	123	456

Do some research to answer the following.

1. Tell or guess where the names of the periods came from?

Suggested Answers

1. Beginning with millions, all the names end in -illions.

   The prefixes used with this ending have special meanings.

   - milli- means 1000
   - bi- means 2
   - tri- means 3
   - quad- means 4
   - quint- means 5
   - sext- means 6
   - sept- means 7
   - oct- means 8
   - non- means 9
   - deci- means 10

   Knowing the meaning of the prefixes, it is easy to guess where the names came from. For example:

   thousands
   ↓
   - 1 million (1 **000** 000) has **1** group of zeros in the thousands period.

   thousands
   ↓
   - 1 billion (1 **000 000** 000) has **2** groups of zeros: one group in the thousands period and one group in the period to the left.

   thousands
   ↓
   - 1 trillion (1 **000 000 000** 000) has **3** groups of zeros: one group in the thousands period and the other groups in the periods to the left.

2. Is a billion the same amount in England as in Canada?

3. Name a situation where a large number such as decillions might be needed.

4. What does *a zillion* mean?

2. A billion in Canada is 1 000 000 000. A billion in England is 1 000 000 000 000. A billion is bigger in England.

3. Decillions might be used in measuring distances in space.

4. A *zillion* is a slang expression for a very big number.

COMPARING AND ORDERING WHOLE NUMBERS

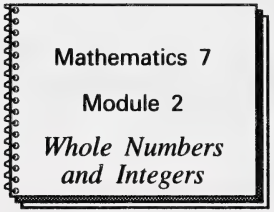
What Lies Ahead

In this section the student will learn these skills.

- comparing whole numbers
- ordering whole numbers

Gathering Materials

For this section the student will need these items.



(Optional)

(Optional)

Math Works: Place Value of Large Numbers (AIT)

Computer Drill and Instruction: Mathematics, Level D (SRA)

Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 3 of the module booklet. The student can view the video or continue reading.
- Next have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

Practice Activities

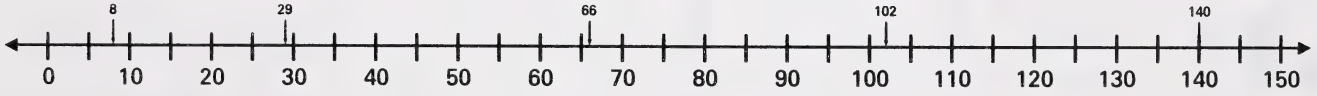
Computer Alternative

1. If you can use a computer, do Lesson 2 of the "Numbers and Numeration" disk from the package *Computer Drill and Instruction: Mathematics, Level D* (SRA).

   Read the instructions in the folder with the disk before using the program. Remember, if you need help or get a question wrong, hold down the SHIFT key and press the ? key.

Print Alternative

2. Place the numbers 8, 29, 66, 102, and 140 on the number line below. The 8 has been placed on the number line as an example.



Suggested Answers

1. Computer corrected

For Questions 3-4, use the food chart on page 22 of the Module Booklet.

3. Compare the energy content of single servings of these foods using < or >.

   a. skim milk and 2% milk

   b. boiled egg and a boiled potato

   c. white bread and whole wheat bread

   d. a banana and an apple

3. a. 360 < 540

   b. 330 < 380

   c. 340 > 300

   d. 420 > 290

4. For breakfast, Hans had single servings of cornflakes, banana, 2% milk, and whole wheat toast with butter. List the energy content of these foods from greatest to least.

4. 540, 420, 300, 245

5. Arrange from least to greatest.

   a. 178, 59, 765, 384, 43

   b. 623, 528, 856, 365, 563

   c. 929, 299, 292, 229, 922

5. a. 43, 59, 178, 384, 765

   b. 365, 528, 563, 623, 856

   c. 229, 292, 299, 922, 929

6. Order all the numbers from greatest to least.

55 082	59 652	35 007	51 908
54 658	52 662	56 062	57 954
58 901	50 657	59 182	54 366

7. The chart below shows the number of farms in each province in 1986. Order the provinces from the greatest number of farms to the least number of farms.

Number of Farms	
Newfoundland	651
Prince Edward Island	2 833
Nova Scotia	4 283
New Brunswick	3 554
Quebec	41 448
Ontario	72 713
Manitoba	27 336
Saskatchewan	63 431
Alberta	57 777
British Columbia	19 063

[1]

6. 35 007, 50 657, 51 908, 52 662, 54 366, 54 658, 55 082, 56 062, 57 954, 58 901, 59 182, 59 652,

7. Ontario, Saskatchewan, Alberta, Quebec, Manitoba, British Columbia, Nova Scotia, New Brunswick, Prince Edward Island, Newfoundland

Guiding the Student

- Have the student do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors. Emphasize the process not the answers.

[1]Statistics Canada.

Concluding Activities

1. Compare the serial numbers on two or more five-dollar bills. Tell which was printed first.

2. Counting numbers are arranged in four columns as shown. Under which letter will the number 101 appear?

A	B	C	D
1	2	3	4
8	7	6	5
9	10	11	12
16	15	14	13

Suggested Answers

1. Answers will vary.

2. 101 is in Column D.

[1]Alberta Education for the excerpt from *Problem Solving Challenge for Mathematics,* Edmonton, 1985.

3. Rob has 3 dogs. the largest dog is 3 kg heavier than the medium-size dog. The medium-size dog is 4 kg heavier than the smallest dog. Together the three dogs have a mass of 29 kg. What is the mass of each dog?

3. Use guess-check-revise methods.

Guess #1
4
8
11
23 ← too small

Guess #2
5
9
12
26 ← too small

Guess #3
6
10
13
29 ✓

The dogs weigh 6 kg, 10 kg, and 13 kg.

ROUNDING WHOLE NUMBERS

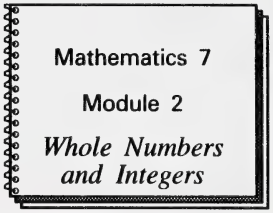
What Lies Ahead

In this section the student will learn these skills.

- rounding whole numbers
- identifying rounded and exact numbers

Gathering Materials

For this section the student will need these items.



(Optional)

Computer Drill and Instruction: Mathematics, Level D (SRA)

Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 4 of the module booklet.
- Next have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the following page.

Practice Activities

1. Answer true (T) or false (F).

   a. The number for A is closer to 500 than to 600.

   b. The number for B is closer to 500 than 600.

   c. The number for C is closer to 600 than 700.

   d. The number for D is closer to 700 than 800.

   e. The number for E is closer to 800 than 900.

2. The number in the middle is closer to one of the outside numbers than the other. Tell which number it is closer to. One has been done for you as an example.

   a. 30, 32, 40

   b. 80, 85, 90

   c. 200, 219, 300

   d. 600, 651, 700

   e. 30 000, 37 215, 40 000

   f. 900 000, 968 200, 1 000 000

Suggested Answers

1. a. True

   b. False

   c. True

   d. False

   e. True

2. a. 30

   b. 90

   c. 200

   d. 700

   e. 40 000

   f. 1 000 000

Computer Alternative

3. If you can use a computer, do Lessons 6, 7, and 8 of the disk "Numbers and Numeration" from the package *Computer Drill and Instruction: Mathematics, Level D* (SRA).

   Read the instructions in the folder with the disk before you use the program. If you need help or get a question wrong, hold down the SHIFT key and press the [?] key.

3. Computer checked.

Print Alternative

4. Round to the nearest thousand.

   a. 6071

   b. 5982

4. a. 6000

   b. 6000

5. Round to the nearest hundred thousand.

   a. 784 300

   b. 452 121

5. a. 800 000

   b. 500 000

6. Round to the nearest ten million.

   a. 9 825 850

   b. 120 980 000

6. a. 10 000 000

   b. 120 000 000

7. The following chart shows the number of tourist visits to Canada. Round each number in the chart to these places.

   a. the nearest ten thousand

   b. the nearest hundred thousand

Tourist Visits to Canada		rounded to nearest ten thousand	rounded to nearest hundred thousand
United States	12 499 000	12 500 000	12 500 000
Europe	892 322	890 000	900 000
Asia	196 439	200 000	200 000
Caribbean	110 721	110 000	100 000
Australasia	55 508	60 000	100 000
South America	46 370	50 000	0
Africa	26 196	30 000	0

[1]

Guiding the Student

- Have students do the Concluding Activities.
- Afterwards, help the student check the answers and correct any errors. Suggested answers are on the next page.

[1]Statistics Canada.

Concluding Activities

Jack and his father are shopping. His father has a limited amount of money which he cannot overspend. He has no calculator, so he is rounding prices and adding as he goes along. Jack's father rounds every price to the highest dollar,even if the price is closer to the lowest dollar (e.g. $2.29 ≐ $3.00, instead of $2.00).

1. Why do you think Jack's father always rounds up? What is the advantage of this method?

2. What is the disadvantage of this method?

Suggested Answers

1. Jack's father does not want to overspend. If he rounds up, the rounded number is always more than the exact number. This makes him more cautious while he shops.

2. The rounded number is much more than the exact number. Always rounding up is never very accurate.

ESTIMATING SUMS

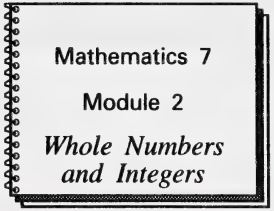
What Lies Ahead

In this section the student will learn these skills.

- deciding when to make estimates
- estimating whole number sums

Gathering Materials

For this section the student will need these items.



(Optional)

Math Works: Place Value of Large Numbers (AIT)

Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" of Section 5 of the module booklet. The student can view the video program or continue reading.
- Then have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

Practice Activities

Do either Question 1 or 2.

1. If you watched the video, answer the following questions about the video, "Using Estimating ad Approximating."

   a. Describe two situations in the story in which approximate numbers were used.

   b. Name two things that Vickie and David measured by estimating.

   c. At the hardware store, why did Grandma, Vickie, and David decide to go back home and measure the attic?

If you did not watch the video, do the following.

2. A newspaper headline reads "25 000 Attend Playoff Game". Is an estimate sufficient in these situations?

   a. the accountant figures out how much money was made on ticket sales?

   b. the newspaper reports the number of people who attended the game?

Suggested Answers

1. a. See video.

   b. See video.

   c. See video.

2. a. The accountant must know the exact number of ticket sales to verify the amount of money received.

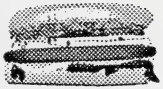
   b. The newspaper reports an estimate number. People are interested in knowing only the approximate number of people that attend a game.

3. Tell whether the number is exact or approximate.

a. A hockey player scored 92 goals in one season.

b. The apartment rent is $356 per month.

c. Fifty-five million hamburgers have been sold.



d. The town has a population of 4000.

e. The Wolds live 172 km from Edmonton.

3. a. exact

b. exact

c. approximate

d. approximate

e. approximate

4. Tell the number of digits in the sums.

a. 38 + 46

b. 825 + 36

c. 1284 + 32

d. 356 + 248

4. a. 2

b. 3

c. 4

d. 3

5. Estimate the sums.

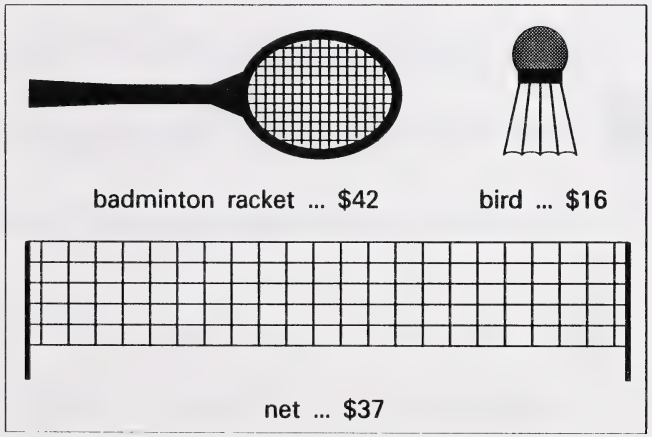
a. 62 + 27

b.
$$\begin{array}{r} 635 \\ +\ 7049 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 921 \\ 367 \\ 405 \\ +\ 883 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 35\,679\,002 \\ +\ 29\,941\,750 \\ \hline \end{array}$$

6. Estimate the cost of the badminton equipment.



Note: Any reasonable estimate is acceptable in Questions 5-7.

	Rounding	Front-end digits
5. a.	60 + 30 ≐ 90	60 + 20 ≐ 80
b.	$\begin{array}{r} 600 \\ +\ 7000 \\ \hline 7600 \end{array}$	$\begin{array}{r} 600 \\ +\ 7000 \\ \hline 7600 \end{array}$
c.	$\begin{array}{r} 900 \\ 400 \\ 400 \\ +\ 900 \\ \hline 2600 \end{array}$	$\begin{array}{r} 900 \\ 300 \\ 400 \\ +\ 800 \\ \hline 2400 \end{array}$
d.	$\begin{array}{r} 36\,000\,000 \\ +\ 30\,000\,000 \\ \hline 66\,000\,000 \end{array}$	$\begin{array}{r} 30\,000\,000 \\ +\ 20\,000\,000 \\ \hline 50\,000\,000 \end{array}$

6. Using rounding: $40 + $20 + $40 ≐ $100

Using front-end digits: $40 + $10 + $30 ≐ $80

7. Use the chart below. Estimate the total number of farms.

Number of Farms	
Newfoundland	651
Prince Edward Island	2 833
Nova Scotia	4 283
New Brunswick	3 554
Quebec	41 448
Ontario	72 713
Manitoba	27 336
Saskatchewan	63 431
Alberta	57 777
British Columbia	19 063

[1]

7. Using rounding:

1 000
3 000
4 000
4 000
41 000
73 000
27 000
63 000
58 000
19 000
293 000

Using front-end digits:

600
2 000
4 000
3 000
40 000
70 000
20 000
60 000
50 000
10 000
259 600

Guiding the Student

- If the student had difficulties, assign the Extra Practice Activities.
- If the student had success, assign the Concluding Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

[1]Statistics Canada.

Extra Practice

1. Estimate the sums. Fill in the letter of the line to which each sum belongs. One has been done as an example.

   a. 200 + 840

   b. 654 + 87

   c. 982 + 1025

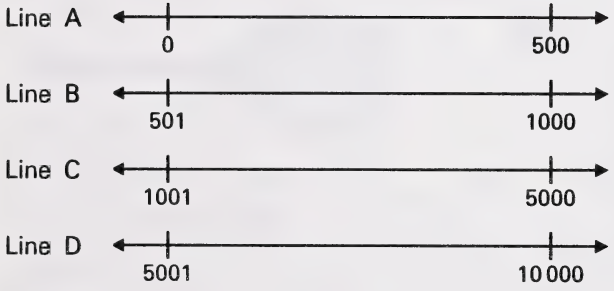
   d. 146 + 283

   e. 845 + 4525

   f. 96 + 1025

   g. 999 + 3

   h. 2042 + 4650



1

Suggested Answers

1. a. Line C

   b. Line B

   c. Line C

   d. Line A

   e. Line D

   f. Line C

   g. Line C

   h. Line D

[1]National Council of Teachers of Mathematics for excerpts from *Ideas from the Arithmetic Teacher,* Reston, Virginia, 1979.

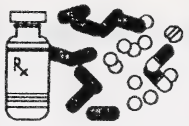
2. In each case, tell if an exact number would be needed, or if an estimate would be good enough.

   a. You want to calculate pay cheques.

   b. You want to figure out the number of hot dogs needed for a picnic.

   c. You want to find the distance to be travelled on a vacation trip.

   d. You want to find a medicine dosage.



2. a. exact

   b. estimate

   c. estimate

   d. exact

Guiding the Student

- Have the student do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

Concluding Activities

1. Circle the most accurate estimate from the choices given at the right.

   a. 83 + 49

   b. 152 + 108

   c. 32 460 + 5 666

   d.
   $$\begin{array}{r} 819 \\ 273 \\ +\ 590 \\ \hline \end{array}$$

2. Estimate the sums of the following. Predict whether the exact sum will be more or less than the estimate.

   a. 711 + 623

   b.
   $$\begin{array}{r} 6470 \\ +\ 2830 \\ \hline \end{array}$$

   c.
   $$\begin{array}{r} 78\,420 \\ +\ 56\,311 \\ \hline \end{array}$$

Suggested Answers

1. a. 80, 100, (130,) 150

   b. 150, 100, (250,) 300

   c. 32 000, 35 000, (38 000,) 40 000

   d. 1600, (1700,) 1800, 2000

2. a.
   $$\begin{array}{r} 700 \\ +\ 600 \\ \hline 1300 \end{array}$$
   The sum will be more than the estimate.

   b.
   $$\begin{array}{r} 6000 \\ +\ 3000 \\ \hline 9000 \end{array}$$
   The sum will be more than the estimate.

   c.
   $$\begin{array}{r} 80\,000 \\ +\ 60\,000 \\ \hline 140\,000 \end{array}$$
   The sum will be less than the estimate.

ESTIMATING DIFFERENCES

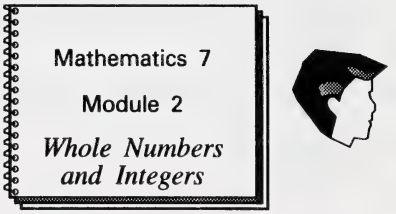
What Lies Ahead

In this section the student will learn these skills.

- estimating whole number differences
- determining whether a calculated difference is reasonable, or whether an error was made

Gathering Materials

For this section the student will need this item.



Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 6 of the module booklet.
- Then have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

Practice Activities

1. Circle the most accurate estimate from the choices given at the right.

   a. 85 − 48

   b. 693 − 485

   c. 53240 − 14881

   d.
   $$\begin{array}{r} 65\,523\,700 \\ -\ 8\,250\,194 \\ \hline \end{array}$$

2. Tell whether the difference will be more or less than 500.

   a.
   $$\begin{array}{r} 630 \\ -\ 185 \\ \hline \end{array}$$

   b.
   $$\begin{array}{r} 741 \\ -\ 369 \\ \hline \end{array}$$

   c.
   $$\begin{array}{r} 309\,477 \\ -\ 308\,995 \\ \hline \end{array}$$

   d. 5789 − 5190

Suggested Answers

1. a. (50,) 60, 70, 100

   b. 100, 150, (200,) 300

   c. (38 000,) 39 000, 40 000, 45 000

   d. 55 000 000, 57 000 000, (58 000 000,) 60 000 000

2. a. less

   b. less

   c. less

   d. more

3. Estimate the difference and predict whether the exact difference will be more or less than the estimate.

   a. $\begin{array}{r} 326 \\ -\ 189 \\ \hline \end{array}$

   b. $\begin{array}{r} 741 \\ -\ 369 \\ \hline \end{array}$

   c. $\begin{array}{r} 309\,477 \\ -\ 308\,995 \\ \hline \end{array}$

   d. 607 − 339

   e. 41 777 − 28 666

4. If 376 out of 2145 employees of an airline are pilots, estimate the number of employees who are not pilots.

In Questions 3-5 accept a range of estimates.

	Using rounding:	Using front-end digits:
3. a.	300 − 200 ≐ 100 (more)	300 − 100 ≐ 200 (less)
b.	700 − 400 ≐ 300 (more)	700 − 300 ≐ 400 (less)
c.	309 000 − 308 000 ≐ 1000 (less)	300 000 − 300 000 = 0 (more)
d.	600 − 300 ≐ 300 (less)	600 − 300 ≐ 300 (less)
e.	42 000 − 29 000 ≐ 13 000 (more)	40 000 − 20 000 ≐ 20 000 (less)

4. Using rounding: 2100 − 400 ≐ 1700.
   Using front-end digits: 2000 − 300 ≐ 1700.

   About 1700 of the employees are not pilots.

Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Activities.
- If the student had success with the Practice Activities, assign the Concluding Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

Extra Practice

1. Estimate the differences.

   a. $\begin{array}{r} 91 \\ -\ 47 \\ \hline \end{array}$

   b. $\begin{array}{r} 246 \\ -\ 85 \\ \hline \end{array}$

   c. $\begin{array}{r} 5\,174\,808 \\ -\ 2\,606\,283 \\ \hline \end{array}$

   d. 510 − 136

   e. 4491 − 912

2. In Canada 15 334 000 people have English for their mother tongue, while 6 160 000 have French. Estimate how many more people have English for a mother tongue.

Suggested Answers

	Using rounding:	Using front-end digits:
1. a.	$\begin{array}{r} 90 \\ -\ 50 \\ \hline 40 \end{array}$	$\begin{array}{r} 90 \\ -\ 40 \\ \hline 50 \end{array}$
b.	$\begin{array}{r} 250 \\ -\ 90 \\ \hline 160 \end{array}$	$\begin{array}{r} 200 \\ -\ 80 \\ \hline 120 \end{array}$
c.	$\begin{array}{r} 5\,200\,000 \\ -\ 2\,600\,000 \\ \hline 2\,600\,000 \end{array}$	$\begin{array}{r} 5\,000\,000 \\ -\ 2\,000\,000 \\ \hline 3\,000\,000 \end{array}$
d.	$\begin{array}{r} 500 \\ -\ 100 \\ \hline 400 \end{array}$	$\begin{array}{r} 500 \\ -\ 100 \\ \hline 400 \end{array}$
e.	$\begin{array}{r} 4500 \\ -\ 900 \\ \hline 3600 \end{array}$	$\begin{array}{r} 4000 \\ -\ 900 \\ \hline 3100 \end{array}$

2. Using rounding:

$$\begin{array}{r} 15\,000\,000 \\ -\ 6\,000\,000 \\ \hline 9\,000\,000 \end{array}$$

Using front-end digits:

$$\begin{array}{r} 15\,000\,000 \\ -\ 6\,000\,000 \\ \hline 9\,000\,000 \end{array}$$

The number of people in Canada with English for a mother tongue is about 9 000 000.

Concluding Activities

1. Just by estimating, tell which answers cannot be correct.

   a.
   $$\begin{array}{r} 885 \\ -\ 497 \\ \hline 588 \end{array}$$

   b. $9450 - 4888 = 4562$

   c. $15\,784 - 10\,631 = 5153$

   d.
   $$\begin{array}{r} 169\,000\,500 \\ -\ 24\,500\,000 \\ \hline 134\,500\,500 \end{array}$$

2. Check the answers to Question 1 with a calculator.

Suggested Answers

1. a.

Rounding:	Front-end digits:
$\begin{array}{r} 900 \\ -\ 500 \\ \hline 400 \end{array}$	$\begin{array}{r} 800 \\ -\ 400 \\ \hline 400 \end{array}$

   b.

$\begin{array}{r} 9000 \\ -\ 5000 \\ \hline 4000 \end{array}$	$\begin{array}{r} 9000 \\ -\ 4000 \\ \hline 5000 \end{array}$

   c.

$\begin{array}{r} 16\,000 \\ -\ 11\,000 \\ \hline 5\,000 \end{array}$	$\begin{array}{r} 15\,000 \\ -\ 10\,000 \\ \hline 5\,000 \end{array}$

   d.

$\begin{array}{r} 170\,000\,000 \\ -\ 20\,000\,000 \\ \hline 150\,000\,000 \end{array}$	$\begin{array}{r} 160\,000\,000 \\ -\ 20\,000\,000 \\ \hline 140\,000\,000 \end{array}$

   The answers which are not correct are a. and d.

2. a. 388

   b. 4562

   c. 5153

   d. 144 500 500

ESTIMATING PRODUCTS

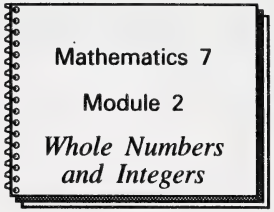
What Lies Ahead

In this section the student will learn these skills.

- estimating whole number products
- determining if a calculated product is reasonable, or whether an error was made

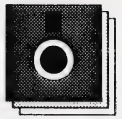
Gathering Materials

For this section the student will need these items.



(Optional)

Solve It: Strategies for Multiplication



(Optional)

Disk A (MAC 6) "Multi Targets"

Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 7 of the module booklet. The student can view the video or continue reading.
- Next have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

Practice Activities

Do Question 1 or 2.

1. If you watched the video program do the following.

   a. Name two estimations made by the boys.

   b. Describe the three estimation strategies by the boys.

   c. Why did the boys use estimations rather than exact calculations?

2. If you did not watch the video, give examples in everyday life when an exact product is needed and when an estimated product is sufficient.

3. How many digits will be in the product?

   a. 230×3

   b. 18×26

   c. 1850×49

   d. 786×952

Suggested Answers

1. a. See video.

   b. See video.

   c. See video.

2. Answers may vary.

3. a. 3

   b. 3

   c. 5

   d. 6

4. Circle the most accurate estimate listed at the right. Then predict whether the actual product will be more or less.

   a. 62 × 29

   b. 19 × 73

   c. 52 × 49

5. Round the second factor to the nearest ten, hundred, or thousand, to make it easy to multiply. Then multiply mentally to get an estimate. One is done as an example.

   a. 5 × 874 is approximately 4500 .

   b. 3 × 57 is approximately 180 .

   c. 6 × 42 is approximately 240 .

   d. 8 × 233 is approximately 1600 .

   e. 6 × 789 is approximately 4800 .

   f. 3 × 2350 is approximately 6000 .

4. a. 1200, 1400, (1800,) 2100 The product is less.

   b. 700, 800, (1400,) 1600 The product is less.

   c. 2000, 2400, (2500,) 3000 The product is more.

6. When using "betweenness" to estimate in multiplication, round both up and down to find estimate boundaries. One is done as an example.

   a. 8 × 542 is between 4000 and 4800 .

   b. 4 × 429 is between 1600 and 1600 .

   c. 7 × 3840 is between 21 000 and 28 000 .

   d. 3 × 256 is between 600 and 900 .

   e. 2 × 850 is between 1600 and 1800 .

7. Estimate by multiplying front digits and using place value to put on the correct number of zeros. One is done as an example.

   a. 34 × 219 is approximately 6000 .

   b. 310 × 220 is approximately 60 000 .

   c. 72 × 53 214 is approximately 3 500 000 .

   d. 68 × 341 is approximately 18 000 .

   e. 524 × 415 is approximately 200 000 .

8. According to a map of the river, marker buoys are 450 m apart. If the boys need to paddle their canoe past 7 more buoys before they arrive at the waterfall, about how far is it to the waterfall? Give upper and lower estimate boundaries.

9. On the map, the distance from Seneca Falls to the fork of the White River is 228 mm. Each mm on the map represents 80 m of actual distance. About how many meters is it from Seneca Falls to the White River?

8. The waterfall is between $7 \times 400 = 2800$ and $7 \times 500 = 3500$ m away from where the boys are now.

9. $200 \times 80 = 16000$ m

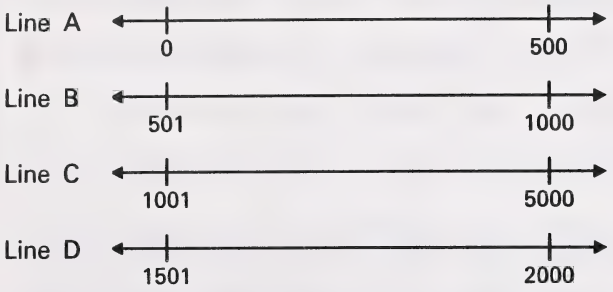
The distance from Seneca Falls to the fork of the White River is about 16000 m.

Guiding the Student

- Have the student correct any errors.
- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- If the student had success, assign the Concluding Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

Extra Practice

Estimate the products. Fill in the letter of the line to which each product belongs. One has been done as an example.



1. 9 × 8	5. 45 × 33	9. 14 × 8
2. 25 × 12	6. 18 × 72	10. 32 × 61
3. 51 × 12	7. 35 × 16	11. 87 × 8
4. 21 × 40	8. 105 × 12	12. 54 × 23

[1]

Suggested Answers

1. A	5. C	9. A
2. A	6. C	10. D
3. B	7. B	11. B
4. B	8. C	12. C

Guiding the Student

- Next have the student do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

[1]National Council of Teachers of Mathematics for excerpts from *Ideas from the Arithmetic Teacher,* Reston, Virginia, 1979.

Concluding Activities

Computer Alternative

1. Do the program, "Multi Targets" on Disk A of MAC 6. Information on the program is in the folder with the disk.

Print Alternative

2. a. Place the numbers 1, 2, 3, 4, and 5 in the boxes to make the largest possible product and the smallest possible product. (Use your calculator to help you decide.)

   b. Now try these numbers: 5, 2, 4, 6, 0.

   c. Now try these numbers: 8, 9, 0, 4, 3.

Suggested Answers

1. Computer-checked

2. a.

	Largest Possible Product	Smallest Possible Product
	4 3 1	2 4 5
	× 5 2	× 1 3

   b.

	5 4 0	4 5 6
	× 6 2	× 2 0

   c.

	8 4 0	4 8 9
	× 9 3	× 3 0

d. Now try these numbers: 6, 2, 4, 3, 8.

e. Now try these numbers: 2, 7, 6, 1, 8.

f. Did you discover a pattern for the largest product? the smallest product? What is the pattern?

[1]

	Largest Possible Product	Smallest Possible Product
d.	6 4 2 × 8 3	3 6 8 × 2 4
e.	7 6 1 × 8 2	2 7 8 × 1 6

f. Arrange the digits in order from largest to smallest. For largest product the largest digit goes where the 5 is, the next largest where the 4 is, the next largest where the 3 is, the next largest where the 2 is, and next largest where the 1 is.

421
× 53

For the smallest product, the largest digit goes where the 1 is, the next largest where the 2 is, the next largest where the 3 is, and next largest where the 4 is, and the next largest where the 5 is.

235
× 14

[1]National Council of Teachers of Mathematics for excerpts from *The Arithmetic Teacher,* Reston, Virginia, October, 1987.

ESTIMATING QUOTIENTS

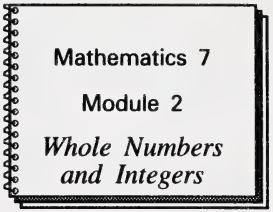
What Lies Ahead

In this section the student will learn these skills.

- estimating whole number quotients
- determining if calculated whole number quotients are reasonable, or whether an error was made

Gathering Materials

For this section the student will need these items.



(Optional)

Solve It: Estimations Strategies for Division (AIT)

(Optional)

Disk A (MAC 6) "Tug of War"

Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 8 of the module booklet. The student can view the video or continue reading.
- Next have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

Practice Activities

Do Question 1 or 2.

1. a. In the video, you were introduced to a manager of a sports stadium. Name two ways in which the manager uses estimation in his daily work.

   b. Describe how Pete estimates the number of chocolate bars he and Benny must sell per hour.

2. If you did not watch the video, describe situations in everyday life in which you might estimate quotients.

3. How many digits will be in the quotients?

   a. 832 ÷ 41

   b. 6178 ÷ 52

   c. 1500 ÷ 21

   d. 38725 ÷ 95

   e. 43872 ÷ 38

Suggested Answers

1. a. See video.

   b. See video.

2. Answers may vary.

3. a. 2

   b. 3

   c. 2

   d. 3

   e. 4

4. Circle the best estimate from the choices given at the right.

a. 268 ÷ 3

b. 500 ÷ 21

c. 763 ÷ 11

d. 387 ÷ 97

4. a. 8, (80,) 800, 8000

b. 2, (20,) 200, 2000

c. 7, (70,) 700, 7000

d. (4,) 40, 400, 4000

5. Circle the front digits of the divisor and dividend you will use to estimate. Then write the estimate. One is done as an example.

a. (46)52 ÷ (5)3

b. 71345 ÷ 21

c. 6189 ÷ 32

d. 65102 ÷ 81

e. 2685 ÷ 32

5. a. (46)52 ÷ (5)3 Estimate: 90

b. (7)1345 ÷ (2)1 Estimate: 3000 or 3500

c. (6)189 ÷ (3)2 Estimate: 200

a. (65)102 ÷ (8)1 Estimate: 800

e. (26)85 ÷ (3)2 Estimate: 80

6. Write a related division problem using friendly numbers. Use it to give an estimate. One is done as an example.

   a. $268 \div 3$

   b. $200 \div 7$

   c. $7150 \div 9$

   d. $137 \div 12$

   e. $152 \div 40$

7. In a month 26 teenagers collected 1386 bottles for recycling. Estimate the number of bottles collected by each teenager.

6. a. $270 \div 3 \doteq 90$

   b. $210 \div 7 \doteq 30$

   c. $7200 \div 9 \doteq 800$

   d. $120 \div 12 \doteq 10$

   e. $160 \div 40 \doteq 4$

7. Any reasonable estimate is acceptable. These use friendly numbers.

   $1500 \div 30 \doteq 50$

   $1400 \div 20 \doteq 70$

   Each teenager collects between 50 and 70 bottles.

Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- If the student had success with the Practice Activities, assign the Concluding Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

Extra Practice

1. Predict the number of digits in the quotient.

   a. $498 \div 30$
   b. $1116 \div 80$
   c. $41623 \div 50$
   d. $53821 \div 25$
   e. $498 \div 57$

2. Circle the most accurate estimate from the choices given at the right.

   a. $53\overline{)2009}$

   b. $24\overline{)10247}$

   c. $42\overline{)12875}$

3. Are the quotients reasonable?

   a. $512 \div 8 = 64$
   b. $7264 \div 33 = 121$
   c. $68085 \div 765 = 89$
   d. $35636 \div 59 = 6040$

Suggested Answers

1. a. 2
   b. 2
   c. 3
   d. 4
   e. 1

2 a. 4, (40,) 400, 4000

   b. 40, 50, (400,) 500

   c. 3, 30, (300,) 3000

3. a. Yes
   b. No
   c. Yes
   d. No

Guiding the Student

- Have the student do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

Concluding Activities

Computer Alternative

1. If you have a computer, do the program "Tug of War" on Disk A of MAC 6. Information on the program is in the folder with the disk.

Print Alternative

2. a. Put the numbers 1, 2, 3, 4, and 5 into the boxes at the right and make the largest possible quotient and the smallest possible quotient. (Use your calculator to help you decide.)

   b. Now try these numbers: 2, 4, 6, 8, 0.

   c. Now try these numbers: 8, 9, 0, 4, 3.

   d. Did you discover a pattern for the largest quotient and the smallest quotient? What is the pattern for each quotient?

Suggested Answers

1. Computer-checked

2. a. Largest Possible Quotient: $\boxed{1}\boxed{2}\overline{)\boxed{5}\boxed{4}\boxed{3}}$ Smallest Possible Quotient: $\boxed{5}\boxed{4}\overline{)\boxed{1}\boxed{2}\boxed{3}}$

   b. $\boxed{2}\boxed{0}\overline{)\boxed{8}\boxed{6}\boxed{4}}$ $\boxed{8}\boxed{6}\overline{)\boxed{2}\boxed{0}\boxed{4}}$

   c. $\boxed{3}\boxed{0}\overline{)\boxed{9}\boxed{8}\boxed{4}}$ $\boxed{9}\boxed{8}\overline{)\boxed{3}\boxed{0}\boxed{4}}$

   d. To obtain the largest quotient divide the largest possible number by the smallest possible.

   To obtain the smallest quotient divide the smallest possible number by the largest possible number.

FINDING SUMS

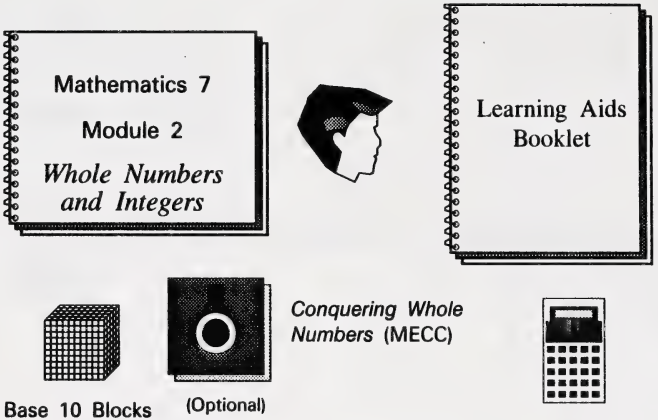
What Lies Ahead

In this section the student will learn these skills.

- computing exact whole number sums
- checking the accuracy of whole number sums

Gathering Materials

For this section the student will need these items.



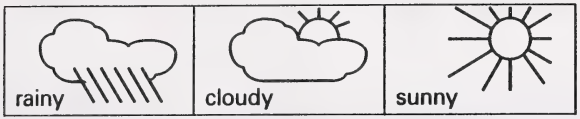
Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 9 of the module booklet.
- Next have the student do the Learning Aids Activities (Exercise B in the *Learning Aids Booklet*) and check the answers. The suggested answers are in the appendix of that booklet.
- After the student has completed the Learning Aids Activities, have the student return to Section 9 in the module booklet. Then read "Working Together" and do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

Practice Activities

Do Questions 1-3 without a calculator.

1. Linda observed weather conditions. How many days did she observe?



9d 20d 12d

2. Find the sums.

   a. 2748 + 345 + 506

   b. 928 + 542 + 140

   c. 8075 + 430

   d. 999 + 22887

   e. 96319 + 4284

   f. 268451 + 917449

Suggested Answers

1. Linda observed weather conditions for 9d + 20d + 12d = 41d.

2. a. 3599

   b. 1610

   c. 8505

   d. 23886

   e. 100603

   f. 1185900

3. Fill in the missing digits.

a.
$$\begin{array}{r} \square\,469 \\ +\ 7\square2\square \\ \hline 109\square3 \end{array}$$

b.
$$\begin{array}{r} \square65 \\ +\ 6\square8 \\ \hline 91\square \end{array}$$

a.
$$\begin{array}{r} \boxed{3}469 \\ +\ 7\boxed{5}2\boxed{4} \\ \hline 109\boxed{9}3 \end{array}$$

b.
$$\begin{array}{r} \boxed{2}65 \\ +\ 6\boxed{4}8 \\ \hline 91\boxed{3} \end{array}$$

4. Solve by using a calculator. The chart shows the population of four Alberta cities in 1986.

Population	
Calgary	636 104
Edmonton	573 982
Lethbridge	58 841
Red Deer	54 425

[1]

Find the total population of the four cities listed in the table.

4. The total population of Alberta's four major cities is 1 323 352.

[1]Statistics Canada.

Computer Alternative

5. If you wish to have more instruction and practice in addition, try the computer program *Conquering Whole Numbers* (MECC). Addition is the first lesson. A description of the program and instructions for use are given in the folder with the disk.

5. Computer-checked.

Guiding the Student

- Have the student read "Working Together" and do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the following page.

Concluding Activities

Do **not** use a calculator on the following.

1. a. In what year were you born? _____
   How many reversals are needed to make a palindrome from your birth year?

   b. Try this with the birth years of other family members and some friends. Who has the most reversals?

Suggested Answers

1. Answers will vary.

   If the student was born in 1977, 11 reversals would be needed.

Step 1.
$$\begin{array}{r} 1977 \\ +\ 7791 \\ \hline 9768 \end{array}$$

Step 2.
$$\begin{array}{r} 9768 \\ +\ 8679 \\ \hline 18\,447 \end{array}$$

Step 3.
$$\begin{array}{r} 18\,447 \\ +\ 74\,481 \\ \hline 92\,928 \end{array}$$

Step 4.
$$\begin{array}{r} 92\,928 \\ +\ 82\,929 \\ \hline 175\,857 \end{array}$$

Step 5.
$$\begin{array}{r} 175\,857 \\ +\ 758\,571 \\ \hline 934\,428 \end{array}$$

Step 6.
$$\begin{array}{r} 934\,428 \\ +\ 824\,439 \\ \hline 1\,758\,867 \end{array}$$

Step 7.
$$\begin{array}{r} 1\,758\,867 \\ +\ 7\,688\,571 \\ \hline 9\,446\,438 \end{array}$$

Step 8.
$$\begin{array}{r} 9\,446\,438 \\ +\ 8\,446\,449 \\ \hline 17\,892\,887 \end{array}$$

Step 9.
$$\begin{array}{r} 17\,892\,887 \\ +\ 78\,829\,871 \\ \hline 95\,722\,758 \end{array}$$

Step 10.
$$\begin{array}{r} 95\,722\,758 \\ +\ 85\,722\,759 \\ \hline 181\,445\,517 \end{array}$$

Step 11.
$$\begin{array}{r} 181\,445\,517 \\ +\ 715\,544\,181 \\ \hline 896\,989\,698 \end{array}$$

2. Below are three sets of digits: 3 fives, 3 ones, and 3 nines. These make a total of nine digits. The object is to cross out six of the digits and leave three so that when added together you have a sum of 20. How can this be done?

5 5 5 1 1 1 9 9 9
1

2. ~~5~~ ~~5~~ ~~5~~ ~~1~~ 1 1 9 ~~9~~ ~~9~~

11 + 9 = 20

[1]Alberta Education for excerpt from *Problem Solving Challenge for Mathematics,* Edmonton, 1985.

FINDING DIFFERENCES

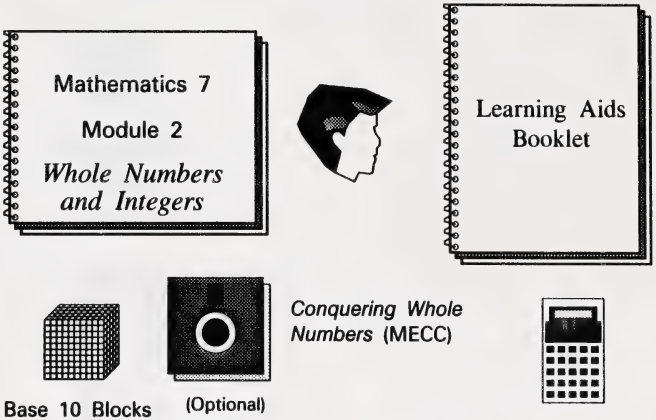
What Lies Ahead

In this section the student will learn these skills.

- computing exact whole number differences
- checking the accuracy of calculated whole number differences

Gathering Materials

For this section the student will need these items.



Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 10 of the module booklet.
- Have the student do the Learning Aids Activities (Exercise C in the *Learning Aids Booklet*) and check the answers. The suggested answers are in the appendix of that booklet.
- After the student has completed the Learning Aids Activities, have the student return to Section 10 in the module booklet. Then read "Working Together" and do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

Practice Activities

Do **not** use a calculator for Questions 1 and 2.

1. Find the difference using paper-and-pencil methods.

a.
$$\begin{array}{r} 5985 \\ -\ 3780 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 4384 \\ -\ 1678 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 885\,312 \\ -\ 235\,209 \\ \hline \end{array}$$

d. $2793 - 329$

e.
$$\begin{array}{r} 50\,000 \\ -\ 6\,237 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 949\,888 \\ -\ 796\,902 \\ \hline \end{array}$$

Suggested Answers

1. a.
$$\begin{array}{r} 5985 \\ -\ 3780 \\ \hline 2205 \end{array}$$

b.
$$\begin{array}{r} 4384 \\ -\ 1678 \\ \hline 2706 \end{array}$$

c.
$$\begin{array}{r} 885\,312 \\ -\ 235\,209 \\ \hline 650\,103 \end{array}$$

d.
$$\begin{array}{r} 2793 \\ -\ 329 \\ \hline 2464 \end{array}$$

e.
$$\begin{array}{r} 50\,000 \\ -\ 6\,237 \\ \hline 43\,763 \end{array}$$

f.
$$\begin{array}{r} 949\,888 \\ -\ 796\,902 \\ \hline 152\,986 \end{array}$$

2. Fill in the missing digits.

a.
$$\begin{array}{r} \square\,1 \\ -\ 3\,\square \\ \hline 4\ 9 \end{array}$$

b.
$$\begin{array}{r} \square\,4\ 6 \\ -\ 9\,\square\ 5 \\ \hline 4\ 4\ \square \end{array}$$

c.
$$\begin{array}{r} \square\,8\ 5\ 1\,\square \\ -\ 2\,\square\,\square\ 6\ 1 \\ \hline 3\ 5\ 4\,\square\ 1 \end{array}$$

2. a.
$$\begin{array}{r} \boxed{8}\,1 \\ -\ 3\,\boxed{2} \\ \hline 4\ 9 \end{array}$$

b.
$$\begin{array}{r} \boxed{7}\,4\ 6 \\ -\ 3\,\boxed{0}\ 5 \\ \hline 4\ 4\,\boxed{1} \end{array}$$

c.
$$\begin{array}{r} \boxed{5}\,8\ 5\ 1\,\boxed{2} \\ -\ 2\,\boxed{3}\,\boxed{0}\ 6\ 1 \\ \hline 3\ 5\ 4\,\boxed{5}\ 1 \end{array}$$

Use a calculator for Question 3.

3. The chart shows jam sales.

Jars of Jam Sold		
Kind	January	April
Strawberry	298	305
Raspberry	254	278

a. How many more jars of strawberry jam than raspberry jam were sold in January?

b. How many more jars of strawberry jam were sold in April than in January?

3. a. $298 - 254 = 44$

44 more jars of strawberry jam were sold in January.

b. $305 - 298 = 7$

7 more jars of strawberry jam were sold April.

Computer Alternative

4. For further instruction and practice in subtraction, try the subtraction lesson, which is the second lesson, in the computer program *Conquering Whole Numbers* (MECC). Information on the program is in the folder with the disk.

4. Computer-checked.

Guiding the Student

- Have the student do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the following page.

Concluding Activities

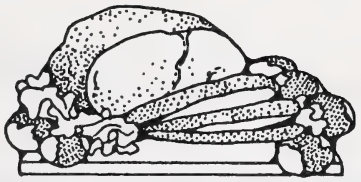
1. Twelve-year olds require about 10.4 megajoules or 10 400 kilojoules of food energy each day.

   Shawn is 12 years old. For dinner, he had the following:

Tomato juice	190 kJ	Broccoli	90 kJ
Roast beef	810 kJ	Strawberries	240 kJ
Baked potato	380 kJ	Milk, whole	660 kJ
Butter	450 kJ	2 slices bread ..	600 kJ

[1]

   To have eaten the required amount for the day, how much food energy should have been provided by Shawn's other meals?



Suggested Answers

1.
$$\begin{array}{r} 10\,400 \\ -\ 3\,420 \\ \hline 6\,980 \end{array}$$

   Shawn's other meals should have provided 6980 kJ of food energy on this particular day.

[1]Reproduced with permission of the Minister of Supply and Services.

2. A pulp and paper company employed 15 003 people. There were 3362 loggers, 1604 office workers, and 5159 maintenance and construction workers. In addition, 772 people worked in the laboratories and 4106 workers processed the paper.

   a. How many of the people employed by the company are not loggers?

   b. How many more people work in the office than in the laboratories?

2. a.
$$\begin{array}{r} 15\,003 \\ -\ 3\,362 \\ \hline 11\,641 \end{array}$$

There are 11 641 people working for this company who are not loggers.

b.
$$\begin{array}{r} 1604 \\ -\ 772 \\ \hline 832 \end{array}$$

There are 832 more people who work in the offices than those working in laboratories.

c. How many fewer people process the paper than work in maintenance and construction?

c.
$$\begin{array}{r} 5189 \\ -\ 4106 \\ \hline 1053 \end{array}$$

There are 1083 fewer people who process paper as compared to maintenance and construction workers.

d. What is the difference of the numbers for the largest group of employees and the smallest group of employees?

d.
$$\begin{array}{r} 5159 \\ -\ 772 \\ \hline 4387 \end{array}$$

The difference between the largest group of workers and the smallest group of workers is 4387.

FINDING PRODUCTS

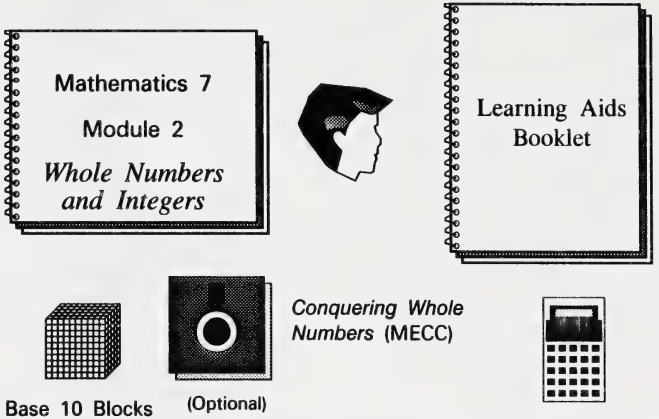
What Lies Ahead

In this section the student will learn these skills.

- computing exact whole number products in column form
- checking the accuracy of exact whole number products

Gathering Materials

For this section the student will need these items.



Guiding the Student

- Have the student read the "What Lies Ahead" box and "Wording Together" in Section 11 of the module booklet.
- Next have the student do the Learning Aids Activities (Exercise D in the *Learning Aids Booklet*) and check the answers. The suggested answers are in the appendix of that booklet.
- After the student has completed the Learning Aids Activities, have the student return to Section 11 in the *Module Booklet*. Then read "Working Together" and do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

Practice Activities

Do **not** use a calculator for Questions 1 and 2.

1. Find the product using paper and pencil methods.

a.
$$\begin{array}{r} 38 \\ \times\ 6 \\ \hline \end{array}$$

b.
$$\begin{array}{r} 17 \\ \times\ 49 \\ \hline \end{array}$$

c.
$$\begin{array}{r} 79 \\ \times\ 40 \\ \hline \end{array}$$

d.
$$\begin{array}{r} 105 \\ \times\ 38 \\ \hline \end{array}$$

e.
$$\begin{array}{r} 273 \\ \times\ 4 \\ \hline \end{array}$$

f.
$$\begin{array}{r} 196 \\ \times\ 303 \\ \hline \end{array}$$

Suggested Answers

1. a.
$$\begin{array}{r} 38 \\ \times\ 6 \\ \hline 228 \end{array}$$

b.
$$\begin{array}{r} 17 \\ \times\ 49 \\ \hline 153 \\ 68 \\ \hline 833 \end{array}$$

c.
$$\begin{array}{r} 79 \\ \times\ 40 \\ \hline 3160 \end{array}$$

d.
$$\begin{array}{r} 105 \\ \times\ 38 \\ \hline 840 \\ 315 \\ \hline 3990 \end{array}$$

e.
$$\begin{array}{r} 273 \\ \times\ 4 \\ \hline 1092 \end{array}$$

f.
$$\begin{array}{r} 196 \\ \times\ 303 \\ \hline 588 \\ 5880 \\ \hline 59388 \end{array}$$

2. Complete.

a.

$$\begin{array}{r} 408 \\ \times\ 68 \\ \hline 3\square\square 4 \\ \square\square 4\ 8 \\ \hline \square\ 7\ \square\ 4\ 4 \end{array}$$

b.

$$\begin{array}{r} 93 \\ \times\ \square\ 6 \\ \hline \square\ 5\ \square \\ \square\ 7\ 9 \\ \hline \square\ 3\ \square\ 8 \end{array}$$

3. a.

$$\begin{array}{r} 408 \\ \times\ 68 \\ \hline 3\ 2\ 6\ 4 \\ 2\ 4\ 4\ 8 \\ \hline 2\ 7\ 7\ 4\ 4 \end{array}$$

b.

$$\begin{array}{r} 93 \\ \times\ 3\ 6 \\ \hline 5\ 5\ 8 \\ 2\ 7\ 9 \\ \hline 3\ 3\ 4\ 8 \end{array}$$

Use a calculator in Questions 3-5.

3. One box of potato chips holds 200 grams. There are 24 boxes packed in a case. How many grams of potato chips are there in one case?

3. $200 \times 24 = 4800$

There are 4800 g of potato chips in one case.

4. A skateboard company has orders for 10 000 skateboards to be shipped by the middle of November. If there are 98 working days left before the delivery date, and if 105 skateboards are made per day, will there be enough skateboards ready to fill the order?

5. A cafeteria sells 294 hamburgers a day. There are 250 working days in a year. How many hamburgers are sold in a year?

4. $98 \times 105 = 10\,290$ and $10\,290 > 10\,000$

   Yes, there will be enough skateboards ready to fill the order.

5. $294 \times 250 = 73\,500$

   In a year, 73 500 hamburgers are sold.

Computer Alternative

6. If you wish to have more instruction and practice in multiplication, try the program for multiplication in *Conquering Whole Numbers* (MECC). Information about the program is in the folder with the disk.

6. Computer checked.

Guiding the Student

- Have the student do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the following page.

Concluding Activities

Use your calculator for these activities

1. Find your age in hours. Use your age as of your last birthday.

2. How many days are there in a decade?

3. Many calculators will only display 8 digits. The largest number that can be shown is 99 999 999. Overflow occurs when a result is greater.

Key Press	Display
9 0 0 0 0 0 0 0 × 2 0 =	E 1800000000

Find the products using paper and pencil methods. Then predict the calculator display.

a. 600 000 × 600

b. 15 000 000 × 20

Suggested Answers

1. There are many possible answers.

   Example: If you are 12 years old, your age in hours is this:

   $$12 \times 365 \times 24 = 105\,120$$

   Note: 12 years may include 2 or 3 leap years. Add 24 × 2 or 23 × 3 hours.

2. 365 × 10 = 3650

   There are 3650 days in a decade.

   Note: A decade may include 2 or 3 leap years so 2 or 3 days may be added.

3. a. 360 000 000

   b. 300 000 000

FINDING QUOTIENTS

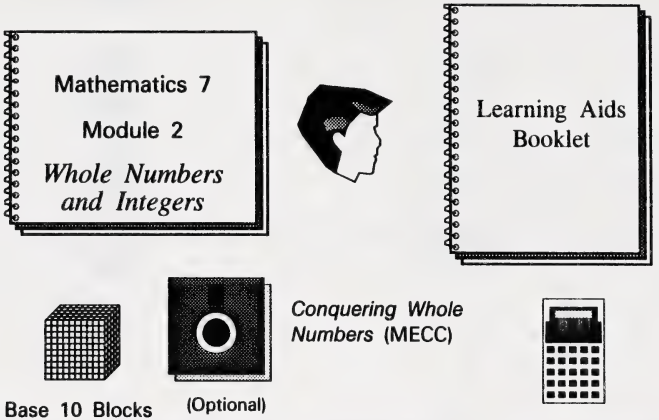
What Lies Ahead

In this section the student will learn these skills.

- computing exact whole number quotients
- checking the accuracy of exact whole number quotients

Gathering Materials

For this section the student will need these items.



Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 12 of the module booklet.
- Then have the student do the Learning Aids Activities (Exercise E in the *Learning Aids Booklet*) and check the answers. The suggested answers are in the appendix of that booklet.
- After the student has completed the Learning Aids Activities, have the student return to Section 12 in the module booklet. Then read "Working Together" and do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

Practice Activities

Do **not** use calculators for Questions 1 and 2.

1. Find the quotient using long division.

a. $4\overline{)2248}$

b. $7\overline{)15821}$

c. $12\overline{)4308}$

d. $73\overline{)9858}$

e. $352\overline{)9856}$

Suggested Answers

1. a.
$$\begin{array}{r} 562 \\ 4\overline{)2248} \\ \underline{20} \\ 24 \\ \underline{24} \\ 8 \\ \underline{8} \\ 0 \end{array}$$

b.
$$\begin{array}{r} 2260 \text{ R1} \\ 7\overline{)15821} \\ \underline{14} \\ 18 \\ \underline{14} \\ 42 \\ \underline{42} \\ 1 \\ \underline{0} \\ 1 \end{array}$$

c.
$$\begin{array}{r} 359 \\ 12\overline{)4308} \\ \underline{36} \\ 70 \\ \underline{60} \\ 108 \\ \underline{108} \\ 0 \end{array}$$

d.
$$\begin{array}{r} 135 \text{ R3} \\ 73\overline{)9858} \\ \underline{73} \\ 255 \\ \underline{219} \\ 368 \\ \underline{365} \\ 3 \end{array}$$

e.
$$\begin{array}{r} 28 \\ 352\overline{)9856} \\ \underline{704} \\ 2816 \\ \underline{2816} \\ 0 \end{array}$$

2. Find the quotient using short division.

a. $8\overline{)3046}$

b. $4\overline{)3662}$

c. $3\overline{)1905}$

d. $3\overline{)5436}$

Use a calculator for Questions 3-5.

3. Find the quotient.

a. $6381 \div 9$

b. $46\overline{)66\,930}$

c. $\dfrac{43\,010\,000}{850}$

2. a. $8\overline{)3046}$ R6 (6)

b. $4\overline{)3662}$ R2 (2)

c. $3\overline{)1905}$ (1 1)

d. $3\overline{)5436}$ (2)

3. a. 709

b. 1455

c. 50 600

4. A figure skating club sold 98 tickets for a total of $294. What was the price of one ticket?

4. $294 ÷ 98 = $3

   The price per ticket was $3.

5. A drama theatre can seat 1036 people. There are 28 rows, each with the same number of seats. How many seats are there in each row?

5. 1036 ÷ 26 = 37

   There are 37 seats in each row.

Computer Alternative

6. The computer program *Conquering Whole Numbers* has a lesson on division. If you wish to have more instruction and practice, use that program. Instructions are given with the disk.

6. Computer checked.

Guiding the Student

- Have the student read "Working Together" and do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the following page.

Concluding Activities

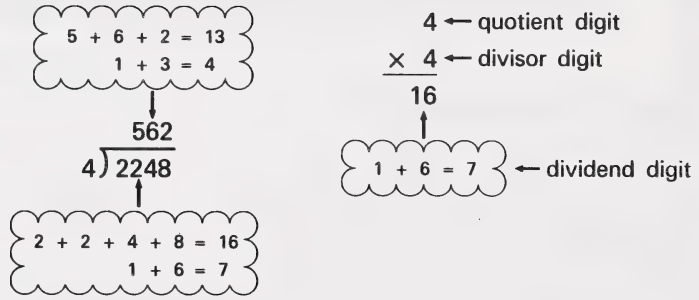
1. Use the casting out nines method to check the division answers in question 1 of the Practice Activities.

   a. $4\overline{)2248}$

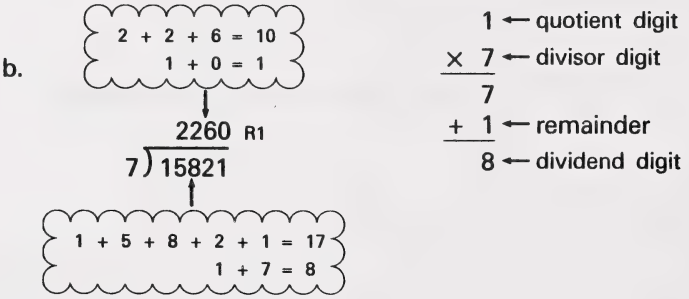
   b. $7\overline{)15821}$

Suggested Answers

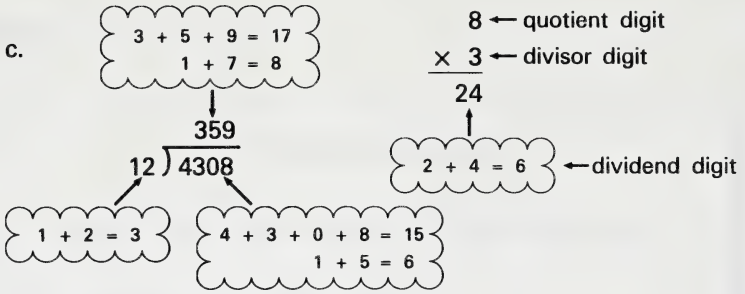
1. a.



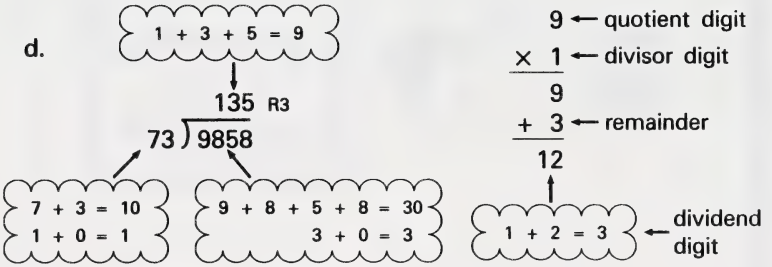
b.



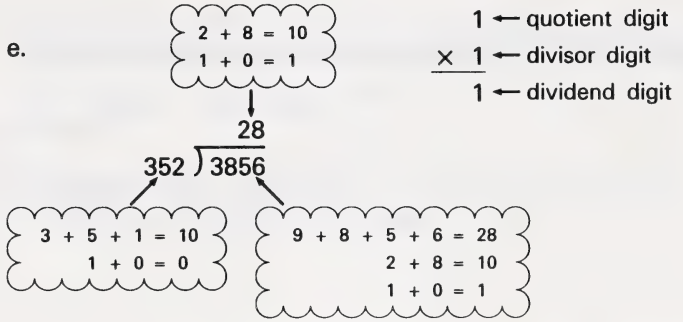
c. $12\overline{)4308}$



d. $73\overline{)9858}$



e. $352\overline{)9856}$



2. Use a calculator and the guess-check-revise method of problem solving to figure out where to place a division sign between the numerals to make a true statement. One has been done as an example.

   a. 48024 = 20

   b. 3046432 = 952

   c. 1728144 = 12

   d. 17289 = 192

3. Each of these questions needs 2 division signs. One has been done as an example.

   a. 384224 = 8

   b. 12501025 = 5

2. a. 480 ÷ 24 = 20

   b. 30464 ÷ 32 = 952

   c. 1728 ÷ 144 = 12

   d. 1728 ÷ 9 = 192

3. a. (384 ÷ 2) ÷ 24 = 8

   b. (1250 ÷ 10) ÷ 25 = 5

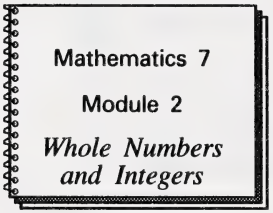
SUMMARY

What Lies Ahead

In this summary the student will review the skills taught in Part One.

Gathering Materials

For this section the student will need these items.



Guiding the Student

- Have the student turn to the Summary in the module booklet and review the skills taught in Part One.
- Then have the student turn to Section 1 to review the pretest and to correct any errors.

GETTING SET

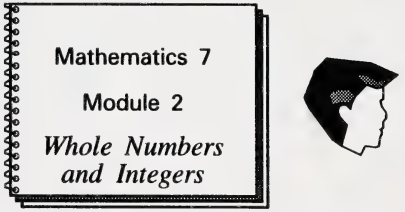
What Lies Ahead

This section tests these skills.

- computing mentally exact whole number sums, differences, products, and quotients
- using the rules for the order of operations

Gathering Materials

For this section the student will need this item.



Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 14 of the module booklet.
- Next have the student do the pretest. The pretest will help you decide what the student will do next.
- Afterwards help the student check the answers. It is **not** necessary for the student to correct any errors at this time. See page 97 for further directions.

Pretest

1. Evaluate mentally.

   a. 28 + 15 + 2

   b. 13 + 15 + 5 + 7

   c. 45 + 38

   d. 73 + 26

   e. 83 − 69

Suggested Answers

1. a. 28 + 15 + 2
   = 30 + 15
   = 45

   b. 13 + 15 + 5 + 7
   = 20 + 20
   = 40

   c. 45 + 38
   = 43 + 40
   = 83

   d. 73 + 26
   = 70 + 20 + 3 + 6
   = 99

   e. 83 − 69
   = 84 − 70
   = 14

f. $72 - 53$

g. 99×14

h. $(15 \times 2) + (15 \times 8)$

i. $20\,000 \div 400$

j. $380 \div 4$

f. $72 - 53$
$= 69 - 50$
$= 19$

g. 99×14
$= 100 \times 14 - 1 \times 14$
$= 1400 - 14$
$= 1386$

h. $(15 \times 2) + (15 \times 18)$
$= 15 \times 20$
$= 300$

i. $20\,000 \div 400$
$= 200 \div 4$
$= 50$

j. $380 \div 4$
$= 360 \div 4 + 20 \div 4$
$= 90 + 5$
$= 95$

2. Evaluate. Show all steps in the space provided.

a. $29 - 5 \times 3$

b. $56 \div (10 + 6 - 8)$

c. $7 + 7 \times 7 + 7$

d. $\dfrac{3 \times 5 - 1}{16 \div 8}$

2. a. $29 - 5 \times 3$
$= 29 - 15$
$= 14$

b. $56 \div (10 + 6 - 8)$
$= 56 \div (16 - 8)$
$= 56 \div 8$
$= 7$

c. $7 + 7 \times 7 + 7$
$= 7 + 49 + 7$
$= 56 + 7$
$= 63$

d. $\dfrac{3 \times 5 - 1}{16 \div 8}$
$= \dfrac{15 - 1}{2}$
$= \dfrac{14}{2}$
$= 7$

Guiding the Student

After checking the answers, compare the student's results with the following chart. This chart lists the skills covered in the Pretest and the section in which the skill will be taught.

Question	Skill	Section
1a, 1b, 1c, 1d	Adding Mentally	15
1e, 1f	Subtracting Mentally	16
1g, 1h	Multiplying Mentally	17
1i, 1j	Dividing Mentally	18
2	Order of Operations	19

Help the student to decide what to do next. It is recommended that the student does most of the sections which correspond to the questions with which the student experienced difficulties and only the concluding activities in sections which correspond to the questions with which the student experienced success.

ADDING MENTALLY

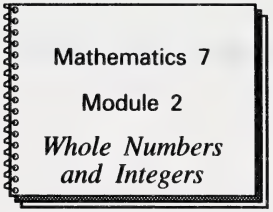
What Lies Ahead

In this section the student will learn this skill.

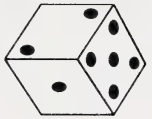
- computing exact whole number sums mentally

Gathering Materials

For this section the student will need these items.



(Optional)



Mathematics: Using Mental Computation for Addition (AIT)

Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 15 of the module booklet. The student can view the video or continue reading.
- Then have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

Practice Activities

1. Are the following equations true or false? Why?

   a. $1803 + 0 = 0$

   b. $(69 + 33) + 7 = 69 + (33 + 7)$

   c. $12 + 7 + 8 + 13 = (7 + 8) + 10 + 13$

   d. $800 + 5 + 60 + 1200 = (1200 + 800) + (60 + 5)$

Suggested Answers

Reasons

1. a. False — $1803 + 0 = 1803$

   b. True — associative property or grouping change

   c. False — $40 \neq 38$

   d. True — commutative property or order change

2. Add mentally. Look for sums of 10.

a. 7 + 6 + 8 + 2 + 3

b. 6 + 9 + 1 + 4 + 8

c. 3 + 2 + 2 + 8 + 7 + 5 + 4 + 5

d. 7 + 8 + 1 + 2 + 9 + 3 + 5 + 8 + 5

2. a. 8 + 2 = 10, 7 + 3 = 10
10 + 10 + 6 = 26

b. 9 + 1 = 10, 2 + 8 = 10
10 + 10 + 8 = 28

c. 3 + 7 = 10, 2 + 8 = 10, 5 + 5 = 10
10 + 10 + 10 + 6 = 36

d. 7 + 3 = 10, 8 + 2 = 10, 1 + 9 = 10,
5 + 5 = 10
10 + 10 + 10 + 10 + 8 = 48

3. Add mentally. Look for sums of 100.

   a. 75 + 60 + 29 + 25 + 40

   b. 50 + 1 + 24 + 76 + 50 + 99 + 3

   c. 25 + 60 + 25 + 40 + 50 + 18

4. Find the sum mentally. Look for possible changes in order or grouping.

   a. 19 + 15 + 1

   b. 127 + 44 + 3

   c. 159 + 13 + 7 + 21

3. a. 75 + 25 = 100, 60 + 40 = 100
   100 + 100 + 29 = 229

   b. 24 + 76 = 100, 50 + 50 = 100, 1 + 99 = 100
   100 + 100 + 100 + 3 = 303

   c. 25 + 25 + 50 = 100, 60 + 40 = 100
   100 + 100 + 18 = 218

4. a. (19 + 1) + 15
   20 + 15 = 35

   b. (127 + 3) + 44
   130 + 44 = 174

   c. (159 + 21) + (13 + 7)
   180 + 20 = 200

5. Add mentally by the left-right method.

a. $27 + 42$

b.
$$\begin{array}{r} 12 \\ 61 \\ +\ 215 \end{array}$$

c. $23 + 66$

5. a.
$$\begin{array}{r} 27 \\ +\ 42 \end{array} \rightarrow \begin{array}{l} 20 + 7 \\ 40 + 2 \\ \hline 60 + 9 = 69 \end{array}$$

b.
$$\begin{array}{r} 12 \\ 61 \\ 215 \end{array} \rightarrow \begin{array}{l} 10 + 2 \\ 60 + 1 \\ \hline 200 + 10 + 5 \\ 200 + 80 + 8 = 288 \end{array}$$

c.
$$\begin{aligned} & 23 + 66 \\ &= (20 + 60) + (3 + 6) \\ &= 80 + 9 \\ &= 89 \end{aligned}$$

6. Find the sum mentally by the plus-minus method.

a. $33 + 57$

b.
$$\begin{array}{r} 24 \\ +\ 78 \end{array}$$

c. $55 + 138$

6. a.
$$\begin{array}{r} 33 \\ +\ 57 \end{array} \rightarrow \begin{array}{l} 33 - 3 \\ 57 + 3 \end{array} \rightarrow \begin{array}{r} 30 \\ +\ 60 \\ \hline 90 \end{array}$$

b.
$$\begin{array}{r} 24 \\ +\ 78 \end{array} \rightarrow \begin{array}{l} 24 - 2 \\ 78 + 2 \end{array} \rightarrow \begin{array}{r} 22 \\ +\ 80 \\ \hline 102 \end{array}$$

c.
$$\begin{aligned} & 55 + 138 \\ &= (55 - 2) + (138 + 2) \\ &= 53 + 140 \\ &= 193 \end{aligned}$$

7. Add mentally by a method of your choice.

a. 65 + 3 + 15 + 6 + 5 + 1

a. 95

b.
$$\begin{array}{r} 81 \\ +\ 93 \\ \hline \end{array}$$

b. 174

c.
$$\begin{array}{r} 176 \\ +\ 495 \\ \hline \end{array}$$

c. 671

d. 143 + 71 + 19

d. 233

Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- Afterwards, help the student check the answers and correct any errors.
- If the student had success with the Practice Activities, have the student read "Working Together" and do the Concluding Activities.
- Afterwards discuss the Concluding Activities.

Extra Practice

1. Find the sums mentally. Use any of the strategies you learned in this section.

   a. 5 + 3 + 10 + 14 + 2 + 6

   b.
   $$\begin{array}{r} 35 \\ +\ 62 \\ \hline \end{array}$$

   c.
   $$\begin{array}{r} 29 \\ +\ 46 \\ \hline \end{array}$$

   d.
   $$\begin{array}{r} 252 \\ +\ 347 \\ \hline \end{array}$$

   e. 50 + 27 + 18 + 100 + 12

Suggested Answers

1. a. 40

   b. 97

   c. 75

   d. 599

   e. 207

2. Mentally compute the distance from Vancouver to Halifax.

Road Distances (km)	
Vancouver to Toronto	4492
Toronto to Montreal	539
Montreal to Halifax	1318

[1]

2. The distance from Vancouver to Halifax is 6349 km.

Guiding the Student

- Have the student read "Working Together" and do the Concluding Activities.
- Afterwards discuss the Concluding Activities.

[1]Statistics Canada.

SUBTRACTING MENTALLY

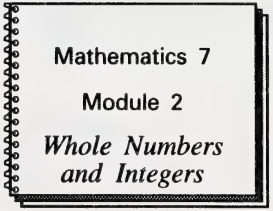
What Lies Ahead

In this section the student will learn this skill.

- computing exact whole number differences mentally

Gathering Materials

For this section the student will need these items.



(Optional)

Mathematics: Using Mental Computation for Subtraction (AIT)

Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 16 of the module booklet. The student can view the video or continue reading.
- Then have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

Practice Activities

1. What do you get when you subtract zero from a number? Write an example.

2. Is there a commutative property for subtraction? That is, can you reverse the order of the numbers? Write an example to support your answer.

3. Subtract mentally by the left-right method.

   a. $\begin{array}{r} 36 \\ -\ 13 \\ \hline \end{array}$

   b. $\begin{array}{r} 147 \\ -\ 25 \\ \hline \end{array}$

   c. $456 - 423$

Suggested Answers

1. You get the number that you started with.

   Example: $9 - 0 = 9$

2. No, numbers in a subtraction problem cannot be reversed.

   Example: $5 - 3 \neq 3 - 5$

   since $5 - 3 = 2$ and $3 - 5 = -2$

3. a. $\begin{array}{r} 30 + 6 \\ -\ 10 + 3 \\ \hline 20 + 3 \end{array} = 23$

   b. $\begin{array}{r} 100 + 40 + 7 \\ -\ \quad 20 + 5 \\ \hline 100 + 20 + 2 \end{array} = 122$

   c. $\begin{array}{r} 400 + 50 + 6 \\ -\ 400 + 20 + 3 \\ \hline 30 + 3 \end{array} = 33$

4. Find the difference mentally by using the attention method.

   a. 63 − 19

   b. 615 − 498

   c. 106 − 66

4. a. $63 - 19 \rightarrow 63 + 1 - 19 + 1 \rightarrow 64 - 20 = 44$

   b. $615 - 498 \rightarrow 615 + 2 - 498 + 2 \rightarrow 617 - 500 = 117$

   c. $106 - 66 \rightarrow 106 + 4 - 66 + 4 \rightarrow 110 - 70 = 40$

5. Calculate the following mentally. Use a strategy of your choice.

   a. 80 − 44

   b. 321 − 123

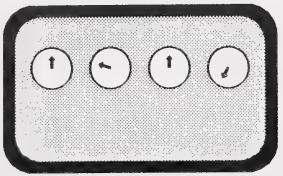
   c. 3059 − 1046

5. a. 36

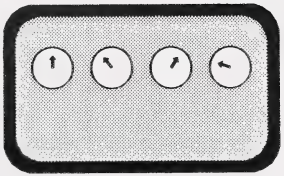
   b. 198

   c. 2013

6. In January, a gas meter read 0806. In February it read 0918. Compute mentally the increase in the meter reading.



January



February

6. Using the attention method.

$$\begin{array}{r} 918 \\ -\ 806 \\ \hline \end{array} \rightarrow \begin{array}{r} 912 \\ -\ 800 \\ \hline 112 \end{array}$$

The increase in the meter reading is 112.

Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- If the student had success with the Practice Activities, assign the Concluding Activities.
- Afterwards help the student check the answers and correct any errors.

Extra Practice

1. Subtract the following mentally. Use any of the strategies you learned in this section.

   a. 99 − 25

   b. $\begin{array}{r} 70 \\ -\ 39 \\ \hline \end{array}$

   c. 335 − 124

   d. $\begin{array}{r} 112 \\ -\ 83 \\ \hline \end{array}$

   e. 60 − 20

Suggested Answers

1. a. 74

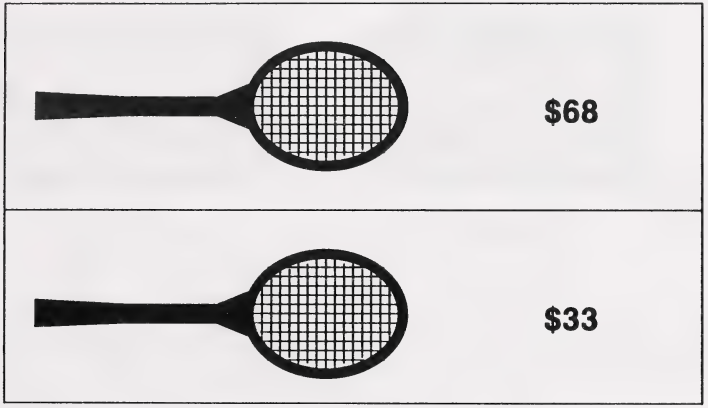
   b. 31

   c. 211

   d. 29

   e. 40

2. Mentally find the difference in the costs of these tennis rackets.



2. 68 − 33 = 35

The difference in the price of the rackets is $35.

Guiding the Student

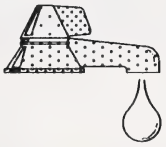
- Have the student do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors.

Concluding Activities

1. The plus-minus method and the attention method are similar. Explain the difference between these methods. Give examples.

2. Try this problem mentally.

   Mr. Chase's water meter presently reads 8 530 000 L. Six months ago it read 8 185 000 L. How much water did the Chase family use in this six-month period?



Suggested Answers

1. The plus-minus method is used in addition.

   Example

$$\begin{array}{r} 73 \\ +\ 14 \\ \hline \end{array} \rightarrow \begin{array}{r} 73 + 4 \\ 14 - 4 \\ \hline \end{array} \rightarrow \begin{array}{r} 77 \\ +\ 10 \\ \hline 87 \end{array}$$

   The attention method is used in subtraction.

   Example

$$\begin{array}{r} 72 \\ -\ 28 \\ \hline \end{array} \rightarrow \begin{array}{r} 72 + 2 \\ 28 + 2 \\ \hline \end{array} \rightarrow \begin{array}{r} 74 \\ -\ 30 \\ \hline 44 \end{array}$$

2. $\begin{array}{r} 530\,000 \\ -\ 185\,000 \\ \hline \end{array}$ OR $\begin{array}{r} 530 \text{ thousand} \\ -\ 185 \text{ thousand} \\ \hline \end{array}$

   using attention method

$$\begin{array}{rcl} 530 + 15 & = & 545 \\ 185 + 15 & = & \underline{200} \\ & & 345 \end{array}$$

   The Chase family used 345 thousand or 345 000 L of water during this six-month period.

MULTIPLYING MENTALLY

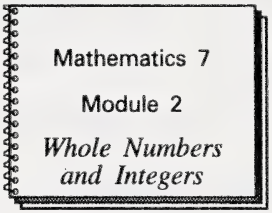
What Lies Ahead

In this section the student will learn this skill.

- computing exact whole number productsmentally

Gathering Materials

For this section the student will need these items.



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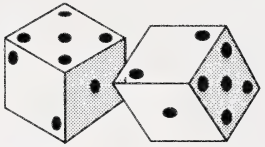


Mathematics: Using Mental Computation for Multiplication (AIT)

Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 17 of the module booklet. The student can view the video or continue reading.
- Then have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

Practice Activities

Do either Question 1 or 2.

1. If you watched the video, answer the following questions about the video *SOLVE IT: "Using Mental Computation for Multiplication"*.

   a. What did Jimmy and Claude have to do when the power in the store went off?

   b. Describe the two methods of mental multiplication used by Great-great-granddaddy Claude.

2. If you did not watch the video, explain when in everyday life you might need to multiply mentally.

3. True or false?

   a. $12 \times 0 = 12$

   b. $1 \times 129 = 129$

   c. $9 \times 88 = 88 \times 9$

   d. $3 \times (8 + 20) = 3 \times 8 + 20$

Suggested Answers

1. a. See video.

   b. See video.

2. Answers may vary.

3. a. False $12 \times 0 = 0$

   b. True $129 = 129$

   c. True $792 = 792$

   d. False $3 \times 28 \neq 24 + 20$

4. Use = which means is equal to or ≠ which means is not equal to to make each of the following a true statement.

   a. $69 \times 1 \bigcirc 69 \times 0$

   b. $(8 \times 5) \times 2 \bigcirc 8 \times (5 \times 2)$

   c. $(6 \times 9) + (4 \times 9) \bigcirc (6 + 4) \times 9$

   d. $(24 \times 1) + (24 \times 3) \bigcirc 24 \times (1 + 3)$

   e. $(16 \times 3) - (14 \times 3) \bigcirc (16 - 4) \times 3$

   f. $(20 + 7) \times (20 + 3) \bigcirc 20 + (7 \times 3)$

4. a. ≠

   b. =

   c. ≠

   d. ≠

   e. ≠

   f. ≠

5. Multiply mentally.

   a. 1000×55

   b. 4×90

   c. 20×50

   d. 1200×300

   e. $80\,000 \times 700$

5. a. 55 000

   b. 360

   c. 1000

   d. 360 000

   e. 56 000 000

6. Find the product mentally.

   a. $5 \times 26 \times 2$

   b. $15 \times 6 \times 5$

   c. $25 \times 18 \times 4$

   d. $12 \times 4 \times 5$

   e. $20 \times 27 \times 5$

   f. $38 \times 25 \times 4$

   g. $(16 \times 2) + (16 \times 18)$

   h. 12×505

6. a. $10 \times 26 = 260$

   b. $15 \times 30 = 450$

   c. $100 \times 18 = 1800$

   d. $12 \times 20 = 240$

   e. $100 \times 27 = 2700$

   f. $38 \times 100 = 3800$

   g. $16(2 + 18) = 16 \times 20 = 320$

   h. $12(500 + 5) = 6000 + 60 = 6060$

7. Multiply mentally by the plus-minus method.

   a. 51×9

   b. 6×86

   c. 98×4

7. a. $(50 \times 9) + (1 \times 9) = 450 + 9 = 459$

   b. $(80 \times 6) + (6 \times 6) = 480 + 36 = 516$

   c. $(100 \times 4) - (2 \times 4) = 400 - 8 + 392$

8. Calculate mentally by the left-right method.

   a. 123×4

   b. 7×609

   c. 555×8

8. a. $(4 \times 100) + (4 \times 20) + (4 \times 3) = 492$

   b. $(7 \times 600) + (9 \times 7) = 4263$

   c. $(500 \times 8) + (50 \times 8) + (5 \times 8) = 4440$

9. Find the product mentally using a method of your choice.

   a. 67×5

   b. 7×249

   c. 102×9

   d. 42×30

9. a. 335

   b. 1743

   c. 918

   d. 1260

Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- Afterwards, help the student check the answers and correct any errors.
- If the student had success with the Practice Activities, have the student read "Working Together" and do the Concluding Activities.
- Afterwards discuss the Concluding Activities.

Extra Practice

1. Multiply mentally.

   a. $9 \times 4 \times 5$

   b. $12 \times 5 \times 7$

   c. $25 \times 20 \times 4$

   d. 4×80

   e. 900×300

2. Multiply mentally. Use the strategies you learned in this section.

   a. 49×6

   b. 2×135

   c. 72×5

Suggested Answers

1. a. 180

   b. 420

   c. 2000

   d. 320

   e. 270 000

2. a. 294

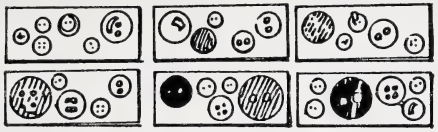
   b. 270

   c. 360

Concluding Activities

1. Solve mentally.

   a. Lucy has 12 cards each containing 8 smaller buttons, and 12 cards each containing 5 large buttons. In all how many buttons does Lucy have?



   b. One crate has 36 1-L pails of maple syrup. How many litres of maple syrup are there in 30 crates?

   c. A box of cookies has 2 rows of cookies. Each row has 11 cookies. There are 12 boxes of cookies in a crate. How many cookies are in the crate?

Suggested Answers

1. a. $12 \times 8 + 12 \times 5$
$= 12(8 + 5)$
$= 12(10 + 3)$
$= 120 + 36$
$= 156$

Lucy has 156 buttons in all.

b. 36×30
$= (30 \times 30) + (6 \times 30)$
$= 900 + 180$
$= 1080$

There are 1080 L of maple syrup in 30 crates.

c. $2 \times 11 \times 12$
$= 22 \times 12$
$= (20 + 2) \times 12$
$= 240 + 24$
$= 264$

There are 264 cookies in the crate.

DIVIDING MENTALLY

What Lies Ahead

In this section the student will learn this skill.

- computing exact whole number quotients mentally

Gathering Materials

For this section the student will need these items.

Mathematics 7

Module 2

Whole Numbers and Integers

Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 18 of the module booklet.
- Then have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors. Suggested answers are on the next page of this booklet.

Practice Activities

1. Write the division in 3 different ways.

   a. 105 divided by 7

   b. 3028 divided by 4

2. Use = or ≠ to make a true statement for each of the following.

   a. $20 \div 1 \bigcirc 20$

   b. $8 \div 0 \bigcirc 0$

   c. $20 \div 4 \bigcirc 4 \div 20$

   d. $(12 \div 6) \div 3 \bigcirc (12 \div 3) + (6 \div 3)$

   e. $(48 \div 12) \div 2 \bigcirc 48 \div (12 \div 2)$

Suggested Answers

1. a. $7\overline{)105}$; $105 \div 7$; $\frac{105}{7}$

   b. $4\overline{)3028}$; $3028 \div 4$; $\frac{3028}{4}$

2. a. =

   b. ≠

   c. ≠

   d. =

   e. ≠

3. Divide mentally.

   a. $650 \div 10$

   b. $3200 \div 40$

   c. $20000 \div 500$

   d. $\frac{48000}{6000}$

   e. $400 \div 200$

4. Divide mentally by the plus-minus method.

   a. $3\overline{)207}$

   b. $96 \div 2$

   c. $\frac{396}{4}$

3. a. 65

   b. 80

   c. 40

   d. 8

   e. 2

4. a. $207 \div 3$
   $= (210 \div 3) - (3 \div 3)$
   $= 70 - 1$
   $= 69$

   b. $96 \div 2$
   $= (90 \div 2) + (6 \div 2)$
   $= 45 + 3$
   $= 48$

   c. $396 \div 4$
   $= (400 \div 4) - (4 \div 4)$
   $= 100 - 1$
   $= 99$

5. Find the quotient mentally by the left-right method.

a. $369 \div 9$

b. $\frac{425}{5}$

c. $8\overline{)656}$

5. a. $396 \div 9$
$= (360 \div 9) + (36 \div 9)$
$= 40 + 4$
$= 44$

b. $425 \div 5$
$= (400 \div 5) + (25 \div 5)$
$= 80 + 5$
$= 85$

c. $656 \div 8$
$= (640 \div 8) + (16 \div 8)$
$= 80 + 2$
$= 82$

6. Divide mentally, using a method of your choice.

a. $\frac{1836}{6}$

b. $5\overline{)2980}$

c. $558 \div 9$

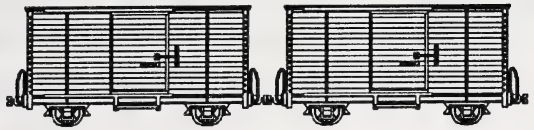
6. a. 306

b. 596

c. 62

7. Solve mentally.

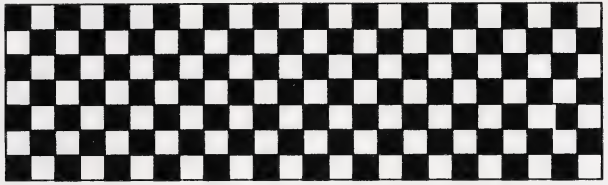
a. If there are 12 000 tonnes of grain in 40 boxcars, how many tonnes are in each boxcar?



7. a. $12\,000 \div 40 = 300$

There are 300 tonnes of grain in each boxcar.

b. If 168 tiles will cover the floor and there are 7 tiles in a column, how many columns of tiles are there?



b. $168 \div 7$
$= (140 \div 7) + (28 \div 7)$
$= 20 + 4$
$= 24$

In all there are 24 columns of tiles on this floor.

Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- Afterwards, help the student check the answers and correct any errors.
- If the student had success with the Practice Activities, assign the Concluding Activities.
- Afterwards discuss the student's game results.

Extra Practice

1. Find the missing quotient, divisor, or dividend.

   a. $31\,000 \div \square = 310$

   b. $\frac{\square}{1} = 4$

   c. $5\overline{)6000}$ (quotient: $\square$)

   d. $\square \div 400 = 30$

   e. $\square\overline{)810\,000}$ (quotient: 900)

2. Divide mentally, using the methods you learned in this lesson.

   a. $84 \div 7$

   b. $4\overline{)196}$

   c. $486 \div 6$

Suggested Answers

1. a. 100

   b. 4

   c. 1200

   d. 12 000

   e. 900

2. a. 12

   b. 49

   c. 81

Guiding the Student

- Have the student read "Working Together" and do the Concluding Activities.
- Afterwards discuss the Concluding Activities.

Concluding Activities

Use a calculator for this activity.

1. Many people make the error of thinking that dividing by zero should give zero for an answer. Here is an investigation to help you think about that idea. With a calculator, do the following series of divisions in the order shown, and record your answers.

   a. 100 ÷ 100 =

   b. 100 ÷ 50 =

   c. 100 ÷ 25 =

   d. 100 ÷ 20 =

   e. 100 ÷ 10 =

   f. 100 ÷ 5 =

   g. 100 ÷ 4 =

   h. 100 ÷ 2 =

   i. 100 ÷ 1 =

Suggested Answers

1. a. 1

   b. 2

   c. 4

   d. 5

   e. 10

   f. 20

   g. 25

   h. 50

   i. 100

2. Notice that the divisors in question 1 are a set of numbers which become smaller and smaller. That is, they approach zero.

   What pattern or trend can you see in the answers? What does this trend suggest about division by zero and the possibility of getting zero as an answer?

2. When the divisor becomes smaller, the quotient becomes larger. From this pattern you can see that using zero as a divisor will never result in zero.

3. Enter any whole number, divide it by 0, and press [=]. What appears on the display? Why?

3. "Error" appears on the display because you cannot divide by zero. Division by zero is undefined.

ORDER OF OPERATIONS

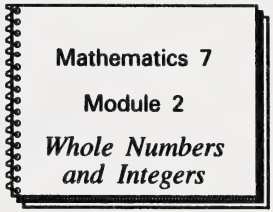
What Lies Ahead

In this section the student will learn this skills.

- using the correct order of operations in calculations

Gathering Materials

For this section the student will need these items.



(Optional)

Computer Drill and Practice: Mathematics, Level D (SRA)

Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 19 of the module booklet.
- Next have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

Practice Activities

1. Evaluate.

   a. $2 \times 24 \div 6 - 6 + 6$

   b. $2 + 8 \div 2 - 5$

   c. $42 - (9 \times 2) \div 3$

   d. $(9 \times 2 \times 2) \div 12$

   e. $12 + 5 \times 2 - 34 \div 2$

Suggested Answers

1. a. $2 \times 24 \div 6 - 6 + 6$
   $= 2 \times 4 - 6 + 6$
   $= 8 - 6 + 6$
   $= 8$

   b. $2 + 8 \div 2 - 5$
   $= 2 + 4 - 5$
   $= 6 - 5$
   $= 1$

   c. $42 - (9 \times 2) \div 3$
   $= 42 - 18 \div 3$
   $= 42 - 6$
   $= 36$

   d. $(9 \times 2 \times 2) \div 12$
   $= (18 \times 2) \div 12$
   $= 36 \div 12$
   $= 3$

   e. $12 + 5 \times 2 - 34 \div 2$
   $= 12 + 5 \times 2 - 17$
   $= 12 + 10 - 17$
   $= 22 - 17$
   $= 5$

2. Use $<$, $>$, or $=$ to make a true statement.

a. $(8 + 3) \times 5 \bigcirc 8 + 3 \times 5$

2. a. $<$

b. $7 + 1 \times 4 \bigcirc 5 \times 2 + 6$

b. $<$

c. $4 \times 9 \div 4 \bigcirc 8 + 2 \times 2$

c. $=$

d. $24 - 12 \div 6 \bigcirc 2 + 6 \times 0$

d. $>$

e. $3 \times 3 \div 3 \bigcirc 3 \div 3 \times 3$

e. $=$

3. Evaluate.

a. $\dfrac{8 + 3 - 1}{2 \times 5 - 8}$

b. $\dfrac{32 - 8}{3 \times 3 \div 3 + 3}$

c. $\dfrac{(2 \times 3) \times 4}{10 - 2 \times 3}$

d. $\dfrac{4 + 2 \times 2 + 4}{(4 \times 6) \div 12}$

e. $\dfrac{20 - 3 \times 2}{(15 + 7) \div 11}$

3. a. $\dfrac{11 - 1}{10 - 8} = \dfrac{10}{2} = 5$

b. $\dfrac{24}{9 \div 3 + 3} = \dfrac{24}{3 + 3} = \dfrac{24}{6} = 4$

c. $\dfrac{6 \times 4}{10 - 6} = \dfrac{24}{4} = 6$

d. $\dfrac{4 + 4 + 4}{24 \div 12} = \dfrac{12}{2} = 6$

e. $\dfrac{20 - 6}{22 \div 11} = \dfrac{14}{2} = 7$

Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- Afterwards, help the student check the answers and correct any errors.
- If the student had success with the Practice Activities, have the student read "Working Together" and do the Concluding Activities.
- Afterwards, help the student check the answers and correct any errors.

Extra Practice

Computer Alternative

1. Do Lessons 1 and 2 of the Pre-Algebra disk from the package *Computer Drill and Practice: Mathematics,* Level D. Read the instructions in the folder with the disk before using the program. Remember if you need help or have an error hold down the SHIFT key and press the [?] key.

   Note: • means multiply.

Print Alternative

2. $9 - 5 + 4 \times 9 - 26 \div 13$.

   a. Which operation is performed first?

   b. Which operation is performed next?

   c. Find the value of the expression.

3. Evaluate $16 - (8 \times 4) \div 32$.

   a. Which operation is performed first?

   b. Which operation is performed next?

   c. Find the value of the expression.

Suggested Answers

1. Computer-checked.

2. a. $26 \div 13$

   b. 4×9

   c. $9 - 5 + 4 \times 9 - 26 \div 13$
   $= 4 + 35 - 2$
   $= 40 - 2$
   $= 38$

3. a. (8×4)

   b. $32 \div 32$

   c. $16 - (8 \times 4) \div 32$
   $= 16 - 32 \div 32$
   $= 16 - 1$
   $= 15$

4. Find the value.

a. $8 \times 7 + 5$

b. $(9 \times 5) \div 3$

c. $32 + 8 \div 4$

d. $56 \div 7 \div 8$

e. $(175 + 12) \times 10$

f. $29 - 16 \div 4 + 7$

g. $5 \times 6 \div (13 - 10)$

4. a. $8 \times 7 + 5$
$= 56 + 5$
$= 61$

b. $(9 \times 5) \div 3$
$= 45 \div 3$
$= 15$

c. $32 + 8 \div 4$
$= 32 + 2$
$= 34$

d. $56 \div 7 \div 8$
$= 8 \div 8$
$= 1$

e. $(175 + 12) \times 10$
$= 187 \times 10$
$= 1870$

d. $29 - 16 \div 4 + 7$
$= 29 - 4 + 7$
$= 25 + 7$
$= 32$

g. $5 \times 6 \div (13 - 10)$
$= 30 \div 3$
$= 10$

Guiding the Student

- Have the student read "Working Together" and do the Concluding Activities.
- Afterwards check the answers and correct any errors.

Concluding Activities

1. Evaluate the following on paper first. Then use your calculator to get the same result. Remember to clear the calculator display before computing. To do this press C.

   a. 12 + 5 × 2

   b. 18 + 6 ÷ 3

   c. 19 − 6 × 2 + 3

   d. 20 − 8 ÷ 4 − 5

Suggested Answers

1. a. 12 + 5 × 2
   = 12 + 10
   = 22

   b. 18 + 6 ÷ 3
   = 18 + 2
   = 20

   c. 19 − 6 × 2 + 3
   = 19 − 12 + 3
   = 7 + 3
   = 10

   d. 20 − 8 ÷ 4 − 5
   = 20 − 2 − 5
   = 18 − 5
   = 13

2. Evaluate the following on paper first. Then use your calculator to get the same result. Remember to clear the calculator display before computing. To do this press [C].

   a. $(5 + 3) \times (9 - 2)$

   b. $(3 + 5 - 2) \div (7 - 5)$

   c. $156 \div (29 - 17)$

   d. $15 - (13 - 2)$

3. a. $(5 + 3) \times (9 - 2)$
   $= 8 \times 7$
   $= 56$

   b. $(3 + 5 - 2) \div (7 - 5)$
   $= (8 - 2) \div (2)$
   $= 6 \div 2$
   $= 3$

   c. $156 \div (29 - 17)$
   $= 156 \div 12$
   $= 13$

   d. $15 - (13 - 2)$
   $= 15 - (11)$
   $= 4$

3. Evaluate the following on paper first. Then use your calculator to get the same answer. Remember to clear the calculator's memory and the calculator display before computing. Press MC to clear the memory.

   a. $9 + 3 \times 15 - 11$

   b. $(8 + 9) - (7 + 2)$

   c. $(12 - 6) \times (10 - 7)$

   d. $7 \times (5 - 3)$

3. a. $9 + 3 \times 15 - 11$
   $= 9 + 45 - 11$
   $= 54 - 11$
   $= 43$

   b. $(8 + 9) - (7 + 2)$
   $= 17 - 9$
   $= 8$

   c. $(12 - 6) \times (10 - 7)$
   $= 6 \times 3$
   $= 18$

   d. $7 \times (5 - 3)$
   $= 7 \times 2$
   $= 14$

4. Use parentheses to make a true statement.

   a. $5 \times 2 - 1 = 5$

   b. $28 - 12 \div 4 = 4$

   c. $7 - 5 \times 12 = 24$

   d. $38 - 13 + 17 - 12 = 20$

   e. $54 \div 12 + 6 \times 6 = 18$

   f. $8 \div 4 + 2 \div 2 + 9 \div 3 + 3 \div 3 - 4 = 0$

4. a. $5 \times (2 - 1) = 5$

   b. $(28 - 12) \div 4 = 4$

   c. $(7 - 5) \times 12 = 24$

   d. $38 - (13 + 17 - 12) = 20$

   e. $54 \div (12 + 6) \times 6 = 18$

   f. $(8 \div 4 + 2) \div 2 + (9 \div 3 + 3) \div 3 - 4 = 0$

Guiding the Student

- Have the student correct any errors made using the paper and pencil method.
- Be sure the student knows how to use the particular calculator he or she has to calculate different series of operations.

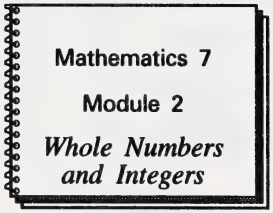
SUMMARY

What Lies Ahead

In this summary the student will review the skills taught in Part Two.

Gathering Materials

For this section the student will need these items.



Guiding the Student

- Have the student turn to Section 20 in the module booklet and reveiw the skills taught in Part Two.
- Then have the student turn to Section 14 to review the pretest and to correct any errors.

GETTING SET

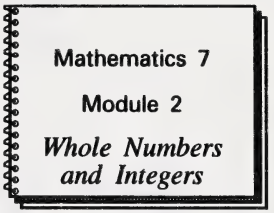
What Lies Ahead

This section will test these skills.

- identifying multiples of whole numbers
- finding multiples, common multiples, and LCM
- finding factors, common factors, and GCF
- classifying numbers as prime or composite
- writing a number as the product of prime factors
- deciding if a number is divisible by 2, 3, 5, 6, 9, or 10
- recognizing powers
- writing the value of a power
- writing numbers in expanded form using powers
- recognizing an integer
- comparing and ordering integers
- adding integers using counters and number lines

Gathering Materials

For this section the student will need these items.



(Optional)

Disk of MAC 6 "Number Stumper"

Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 21 of the module booklet.
- Next have the student do the pretest. This will help you decide what the student will do next.
- Afterwards help the student check the answers. It may not be necessary for the student to correct any errors. See page 150 for further directions.

Pretest

1. Give the first five multiples of the number.

   a. 2

   b. 3

   c. 4

2. Is the second number a multiple of the first?

   a. 3, 24

   b. 7, 74

   c. 35, 5

3. Give all the factors of each number below.

   a. 14

   b. 26

   c. 42

Suggested Answers

1. a. 2, 4, 6, 8, 10

   b. 3, 6, 9, 12, 15

   c. 4, 8, 12, 16, 20

2. a. $24 \div 3 = 8$ Yes

   b. $74 \div 7 = 10$ R4 No

   c. $5 \div 35 = \frac{1}{7}$ No

3. a. 1, 2, 7, 14

   b. 1, 2, 13, 26

   c. 1, 2, 3, 6, 7, 14, 21, 42

4. Which are prime numbers?

   b. 14
   c. 23
   d. 42

5. Find two prime numbers whose sum is a composite number.

6. Find the prime factorization of each number.

   a. 34

   b. 54

   c. 50

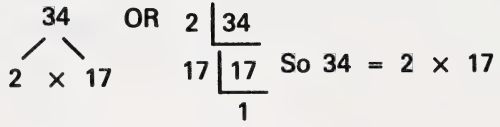
4. a. 5 is a prime number since $5 = 5 \times 1$.

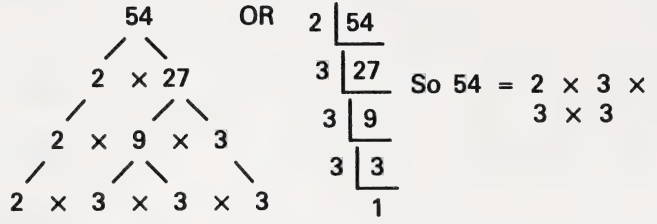
   c. 23 is a prime number since $23 = 23 \times 1$.

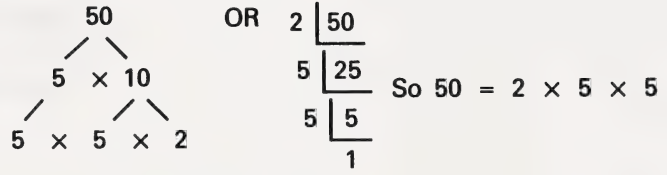
5. These are two of many other possibilities.

   $3 + 7 = 10$

   $2 + 13 = 15$

6. a. 

   b. 

   c. 

7. Is 17245 divisible by each of the numbers? Do not divide or use a calculator.

   a. 2

   b. 3

   c. 5

   d. 9

   e. 10

8. Write each of these numbers as a power of ten.

   a. 100

   b. 1000

   c. 10000

9. Name the base and the exponent in each power given.

   a. 10^1

   b. 25^{100}

7. a. No

   b. No

   c. Yes

   d. No

   e. No

8. a. 10^2

   b. 10^3

   c. 10^4

9. a. The base is 10 and the exponent is 1.

   b. The base is 25 and the exponent is 100.

10. Express each number given as a power.

    a. 25

    b. 32

    c. 81

10. a. 5^2

    b. 2^5

    c. 3^4

11. Find the value of each power given.

    a. 7^2

    b. 10^6

    c. 4^3

11. a. 49

    b. 1 000 000

    c. 64

12. Represent each of the following by a positive or negative number.

    a. 10°C below freezing

    b. 5 floors above ground level

    c. 2 under par

    d. 80 m below sea level

    e. $92 overdrawn

12. a. −10

    b. +5

    c. −2

    d. −80

    e. −92

13. Use > or < to make a true statement for each of these.

    a. $-6 \bigcirc +1$

    b. $+15 \bigcirc -2$

    c. $-8 \bigcirc -5$

    d. $+4 \bigcirc +3$

13. a. $-6 < +1$

    b. $+15 > -2$

    c. $-8 < -5$

    d. $+4 > +5$

14. Write the opposite of each of the following.

    a. $+3$

    b. -5

    c. 0

14. a. -3

    b. $+5$

    c. 0

15. Complete the following number sentences. Use counters or number lines to add.

a. $(+8) + (+2) =$ ☐

b. $(-3) + (-5) =$ ☐

c. $(+2) + (-7) =$ ☐

d. $(-4) + (+9) =$ ☐

15. a. $(+8) + (+2) = +10$

b. $(-3) + (-5) = -8$

c. $(+2) + (-7) = -5$

d. $(-4) + (+9) = +5$

Guiding the Student

After checking the answers, compare the student's results with the following chart. (The chart lists the skills covered in the Pretest and the section in which the skill will be taught.)

Question	Skill	Section
1, 2	Finding Multiples	22
3	Finding Factors	23
4, 5	Identifying Primes and Composite Numbers	24
6	Writing Prime Factorization	25
7	Using Divisibility Rules	26
8, 9, 10, 11	Interpreting Powers	27
12, 13	Recognizing Integers	28
14, 15	Adding Integers	29

Help the student to decide what to do next. It is recommended that the student does most of the sections which correspond to the questions with which the student experienced difficulties and only the Concluding Activities in sections which correspond to the questions with which the student experienced success.

MULTIPLES

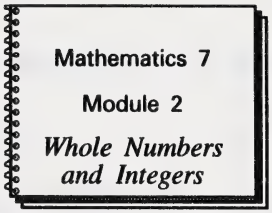
What Lies Ahead

In this section the student will learn these skills.

- identifying multiples of whole numbers
- finding multiples of whole numbers
- finding the least common multiple of two or more whole numbers

Gathering Materials

For this section the student will need these items.



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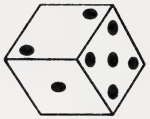


Number Munchers
"Multiples"

Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 22 of the module booklet.
- Have the student do the Practice Activities.
- Afterwards help the student check the answers.

Practice Activities

1. Give the first five multiples of each number given.

   a. 3

   b. 5

   c. 6

   d. 7

2. Is the first number a multiple of the second number?

   a. 94, 7

   b. 86, 4

   c. 98, 12

   d. 56, 14

   e. 35, 7

   f. 49, 6

Suggested Answers

1. a. 3, 6, 9, 12, 15

   b. 5, 10, 15, 20, 25

   c. 6, 12, 18, 24, 30

   d. 7, 14, 21, 28, 35

2. a. No, since $94 \div 7 = 13$ R3.

   b. No, since $86 \div 4 = 21$ R2.

   c. No, since $98 \div 12 = 8$ R2.

   d. Yes, since $56 \div 14 = 4$.

   e. Yes, since $35 \div 7 = 5$.

   f. No, since $49 \div 6 = 8$ R1.

3. a. Is 6 a multiple of 3?

b. Is 3 a multiple of 6?

c. Is 297 a multiple of 3?

d. Is 297 a multiple of 6?

3. a. Yes, since $6 \div 3 = 2$.

b. No, since $3 \div 6 = 0.5$.

c. Yes, since $297 \div 3 = 99$.

d. No, since $297 \div 6 = 49.5$.

Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- Afterwards, help the student check the answers and correct any errors.
- If the student had success with the Practice Activities, have the student read "Working Together" and do the Concluding Activities.
- Afterwards, discuss the Concluding Activities.

Extra Practice

1. Give the first six multiples of the following numbers.

   a. 2

   b. 4

   c. 12

2. Is the first number a multiple of the second number?

   a. 86, 2

   b. 26, 4

   c. 23, 3

   d. 75, 5

Suggested Answers

1. a. 2, 4, 6, 8, 10, 12

   b. 4, 8, 12, 16, 20, 24

   c. 12, 24, 36, 48, 60, 72

2. a. Yes, since 86 ÷ 2 = 43.

   b. No, since 26 ÷ 4 = 6 R2.

   c. No, since 23 ÷ 7 = 7 R2.

   d. Yes, since 75 ÷ 5 = 15.

Guiding the Student

- Have the student read "Working Together" and do the Concluding Activities.
- Afterwards discuss the Concluding Activities.

Concluding Activities

Computer Alternative

1. Play the game "Multiples" on the *Number Munchers* disk.

Print Alternative

2. Play the game "Multiple Tic-Tac-Toe" with another person. You will need one die and several 2-coloured disks. Use the game board provided in the appendix of the module booklet.

Suggested Answers

1. Computer checked.

2. Directions are in the module booklet. Discuss the game result with the student.

FACTORS

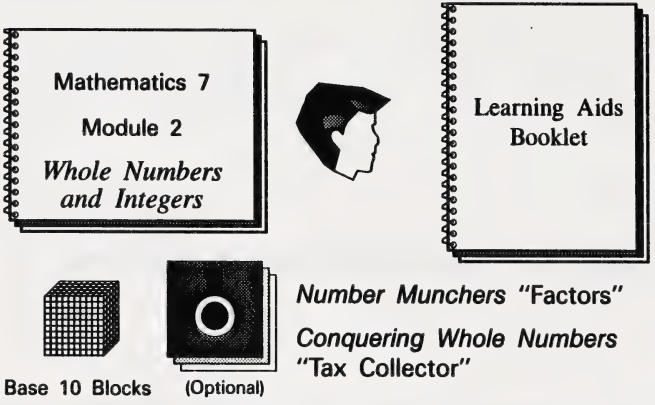
What Lies Ahead

In this section the student will learn these skills.

- finding the factors of a number
- finding the greatest common factor of two or more numbers

Gathering Materials

For this section the student will need these items.



Number Munchers "Factors"

Conquering Whole Numbers "Tax Collector"

Guiding the Student

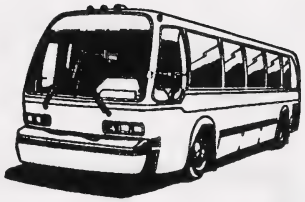
- Have the student read the "What Lies Ahead" box and "Working Together" in Section 23 in the module booklet.
- Next have the student do the Learning Aids Activities (Exercise F in the *Learning Aids Booklet*) and check the answers. The suggested answers are in the appendix of that booklet.
- After the student has completed the Learning Aids Activities, have the student return to Section 23 in the module booklet. Then read "Working Together" and do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

Practice Activities

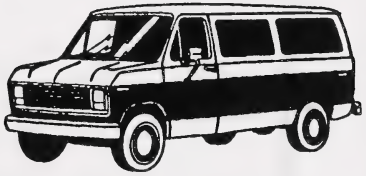
Use whole numbers to answer the Questions.

1. There are 168 people going skiing.

   a. A bus can take 42 people. How many buses would be needed to provide transportation for all the people going skiing?



   b. A van can take 12 people. How many vans would be needed to accommodate all the people going skiing?



   c. A car can take 4 people. How many cars would be needed to take all the skiers skiing?

Suggested Answers

1. a. The number of buses needed is 108 ÷ 42 = 4.

   b. The number of vans needed is 108 ÷ 12 = 14.

   c. The number of cars needed is 108 ÷ 4 = 42.

2. Find all the factors of the numbers.

a. 30

b. 32

c. 59

d. 70

2. a. 1, 2, 3, 5, 6, 10, 15, 30

b. 1, 2, 4, 8, 16, 32

c. 1, 59

d. 1, 2, 5, 10, 14, 35, 70

3. Does each of the following numbers have 8 as a factor?

   a. 30

   b. 40

   c. 87

   d. 144

3. a. No

   b. Yes

   c. No

   d. Yes

4. Complete with the word "factor" or "multiple."

   a. 3 is a _____ of 12 and

      12 is a _____ of 3.

   b. 12 is a _____ of 4 and

      4 is a _____ of 12.

4. a. factor; multiple

   b. multiple; factor

5. What number is a factor of every number?

5. A factor of every number is 1.

Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- Afterwards, help the student check the answers and correct any errors.
- If the student had success with the Practice Activities, have the student read "Working Together" and do the Concluding Activities.
- Afterwards, discuss the Concluding Activities.

Extra Practice

Computer Alternative

1. Play the game "Factors" on the *Number Munchers* disk.

Print Alternative

2. Copy and supply the missing factors.

   a. $1 \times \square = 20$

   b. $2 \times \square = 20$

   c. $4 \times \square = 20$

   d. $5 \times \square = 20$

   e. Give all the factors of 20.

Suggested Answers

1. Computer checked.

2. a. $1 \times \boxed{20} = 20$

   b. $2 \times \boxed{10} = 20$

   c. $4 \times \boxed{5} = 20$

   d. $5 \times \boxed{4} = 20$

   e. All the factors of 20 are 1, 2, 4, 5, 10, and 20.

3. a. What number do you try first when finding all the factors of 28?

   b. Do you get a factor?

   c. What number do you try next?

   d. Do you get a factor?

   e. Continue until you have all the factors of 28.

3. a. The number 1 is tried first.

   b. Yes, the factor is 28.

   c. The number 2 is tried next.

   d. Yes, the factor is 14.

   e. All the factors of 28 are 1, 2, 4, 7, 14, and 28.

4. a. What are the factors of 36?

   b. What are the factors of 45?

4. a. The factors of 36 are 1, 2, 3, 4, 6, 9, 12, 18, and 36.

   b. The factors of 45 are 1, 3, 5, 9, 15, and 45.

Guiding the Student

- Have the student read "Working Together" and do the Concluding Activities.
- Afterwards discuss the game results.

Concluding Activities

Computer Alternative

1. Play the game "Tax Collector" on the *Conquering Whole Numbers* disk.

Print Alternative

2. Play the game "Tax Collector" with a partner.

   You will need the coins which are found in the appendix of the module booklet.

Suggested Answers

1. Computer checked.

2. Rules for the game are in the module booklet. Discuss the game results with the student.

PRIME AND COMPOSITE NUMBERS

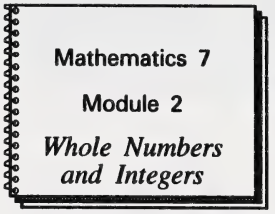
What Lies Ahead

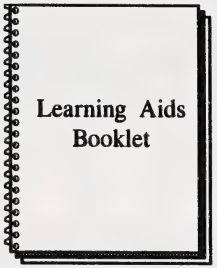
In this section the student will learn this skill.

- classifying numbers as prime or composite

Gathering Materials

For this section the student will need these items.





Base 10 Blocks

(Optional)

Computer Instruction and Drill: Mathematics, Level D

Number Munchers: Primes

Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 24 in the module booklet.
- Next have the student do the Learning Aids Activities (Exercise G in the *Learning Aids Booklet*) and check the answers. The suggested answers are in the appendix of that booklet.
- After the student has completed the Learning Aids Activities, have the student return to Section 24 in the module booklet. Then read "Working Together" and do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

Practice Activities

1. a. Complete the table.

Suggested Answers

Number	Factors	Number of Factors
1	1	1
2	1, 2	2
3	1, 3	2
4	1, 2, 4	3
5	1, 5	2
6	1, 2, 3, 6	4
7	1, 7	2
8	1, 2, 4, 8	4
9	1, 3, 9	3
10	1, 2, 5, 10	4
11	1, 11	2
12	1, 2, 3, 4, 6, 12	6
13	1, 13	2
14	1, 2, 7, 14	4
15	1, 3, 5, 15	4
16	1, 2, 4, 8, 16	5
17	1, 17	2
18	1, 2, 3, 6, 9, 18	6
19	1, 19	2
20	1, 2, 4, 5, 10, 20	6

b. What type of number has exactly two factors?

c. What type of number has more than two factors?

d. Make a list showing the smallest number having exactly 1 factor, exactly 2 factors, and so on up to 6 factors.

b. A prime number has exactly two factors.

c. A composite number as more than two factors.

d. 1 has 1 factor. It is 1.
2 has 2 factors. They are 1 and 2.
4 has 3 factors. They are 1, 2, and 4.
6 has 4 factors. They are 1, 2, 3, and 6.
16 has 5 factors. They are 1, 2, 4, 8, and 16.
12 has 6 factors. They are 1, 2, 3, 4, 6, and 12.

Use the Sieve of Eratosthenes to answer Questions 2-5.

2. Find a pair of prime numbers that has a difference of 1.

3. A pair of prime numbers which has a difference of 2 is called a **twin prime**.

   How many twin primes are there between 2 and 25?

2. The pair 3 and 2 has a difference of 1.

3. There are 4 twin primes between 2 and 25.

   They are 3 and 5
   5 and 7
   11 and 13
   and 17 and 19

4. What is the sum of the 1st, 2nd, 3rd, and 4th primes? Is this sum prime?

4. When these primes are added the sum is $2 + 3 + 5 + 7 = 17$. Yes, this sum is prime.

5. Find four pairs of prime numbers where each pair has a sum of 50.

5. Four pairs of prime numbers whose sums equal 50 are

   3 and 47
   7 and 43
   13 and 37
   and 19 and 31

Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- Afterwards, help the student check the answers and correct any errors.
- If the student had success with the Practice Activities, assign the Concluding Activities.
- Afterwards, help the student check the answers and correct any errors.

Extra Practice

Computer Alternative

1. Do Lesson 14 of the "Numbers and Numeration" disk of the package *Computer Instruction and Drill: Mathematics,* Level D. Read the instructions in the folder with the disk before you use the program. Remember, if you need help or have an error, hold down the SHIFT key and press the ? key.

2. Play the game "Primes" on the *Number Munchers" disk.*

Print Alternative

3. a. What is your age?

   b. Is your age a prime or a composite number? Why?

Suggested Answers

1. Computer checked.

2. Computer checked.

3. a. Answer depends on age.

   b. Answers depend on age. 1 and 13 are primes. 12, 14, and 15 are composite numbers.

4. Is each of the following numbers prime or composite? Tell why in each case.

   a. 6

   b. 11

   c. 29

   d. 33

   e. 50

4. a. 6 is a composite number since it has 4 factors. The factors are 1, 2, 3, and 6.

   b. 11 is a prime number since it has 2 factors. The factors are 1 and 11.

   c. 29 is a prime number since it has 2 factors. The factors are 1 and 29.

   d. 33 is a composite number since it has 4 factors. The factors are 1, 3, 11, and 33.

   e. 50 is a composite number since it has 6 factors. The factors are 1, 2, 5, 10, 25, and 50.

Guiding the Student

- Have the student do the Concluding Activities.
- Afterwards help the student check the answers.

Concluding Activities

1. The numbers 11 and 101 are prime.

   a. Is 1001 prime?

   b. Is 10 001 prime?

   c. Is 100 001 prime?

2. A mathematician named Christian Goldbach theorized in 1742 that every even natural number is equal to the sum of two primes. Test his theory using each of the following numbers.

   a. 4

   b. 6

   c. 8

   d. 10

   e. 12

Suggested Answers

1. a. No, since $1001 = 7 \times 11 \times 13$. 1001 has 5 factors which are 1, 7, 11, 13, and 1001.

   b. Yes, 10 001 is prime.

   c. No, since $100\,001 = 11 \times 9091$. 100 001 has 4 factors which are 1, 11, 9091, and 100 001.

2. a. $2 + 2 = 4$

   b. $3 + 3 = 6$

   c. $3 + 5 = 8$

   d. $5 + 5 = 10$

   e. $5 + 7 = 12$

f. 20

g. 26

h. 38

i. 50

j. 72

f. 3 + 17 = 20

g. 3 + 23 = 26

h. 7 + 31 = 38

i. 3 + 47 = 50

j. 5 + 67 = 72

3. Christian Goldbach also believed that a natural number greater than 7 (even or odd) is equal to the sum of 3 primes. Test his theory using the following numbers.

a. 8

b. 9

c. 10

d. 11

e. 12

3. a. $2 + 3 + 3 = 8$

b. $2 + 2 + 5 = 9$

c. $2 + 3 + 5 = 10$

d. $3 + 3 + 5 = 11$

e. $2 + 5 + 5 = 12$

f. 17

g. 33

h. 52

i. 75

j. 101

f. 5 + 5 + 7 = 17

g. 3 + 13 + 17 = 33

h. 2 + 13 + 37 = 52

i. 3 + 5 + 67 = 75

j. 3 + 5 + 93 = 101

PRIME FACTORS

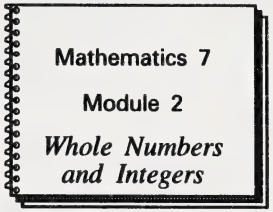
What Lies Ahead

In this section the student will learn these skills.

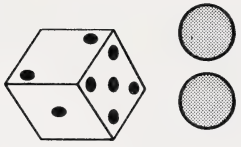
- recognizing prime factors
- expressing a number as a product of prime factors

Gathering Materials

For this section the student will need these items.



(Optional)
Computer Drill and Instruction: Mathematics, Level D (SRA)



Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 25 of the module booklet.
- Have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

Practice Activities

1. The factors of 14 are 1, 2, 7, 14. Which are prime factors?

2. Write the prime factors of each number.

   a. 10

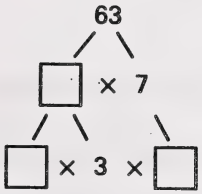
   b. 16

   c. 24

Use a calculator to help find factors in Questions 3-7.

3. Complete the factor tree in each of the following.

   a.



Suggested Answers

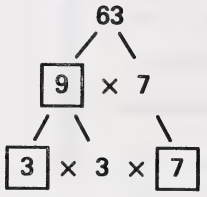
1. 2, 7

2. a. 2, 5

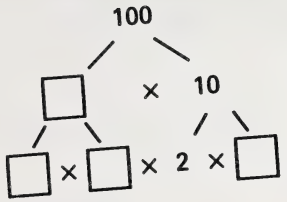
   b. 2

   c. 2, 3

3. a.



b.

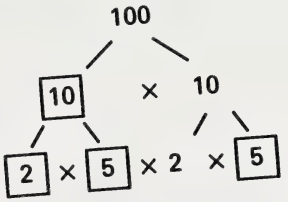


4. Make a factor tree to find the prime factorization for each of these numbers.

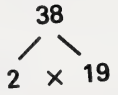
a. 38

b. 42

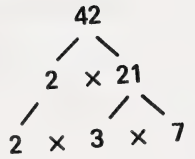
b.



4. a.

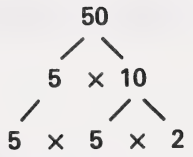


b.



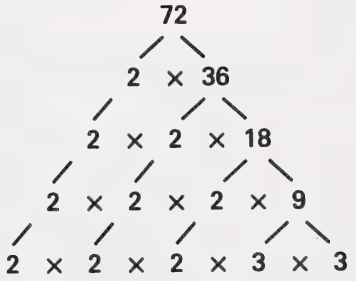
c. 50

c.



d. 72

d.



5. a. What is the least prime number? Is it a factor of 75?

   b. What is the least prime number that is a factor of 75?

   c. Divide to find all the prime factors of 75.

5. a. 2, No

   b. 3

   c. 3, 5, 25, 75

6. Divide by prime factors to find the prime factorization for each of these numbers.

   a. 99

   b. 100

   c. 108

   d. 110

6. a. $3 \times 3 \times 11$

   b. $2 \times 2 \times 5 \times 5$

   c. $2 \times 2 \times 3 \times 3 \times 3$

   d. $2 \times 5 \times 11$

7. Find the prime factorization for each of these numbers.

   a. 39

   b. 56

   c. 60

   d. 288

7. a. 3×13

   b. $2 \times 2 \times 2 \times 7$

   c. $2 \times 2 \times 3 \times 5$

   d. $2 \times 2 \times 2 \times 2 \times 2 \times 3 \times 3$

Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- Afterwards, help the student check the answers and correct any errors.
- If the student had success with the Practice Activities, have the student read "Working Together" and do the Concluding Activities.
- Afterwards, discuss the Concluding Activities.

Extra Practice

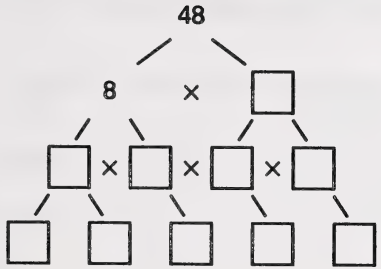
Computer Alternative

1. Do Lesson 15 of the disk "Numbers and Numeration" for the package *Computer Drill and Instruction: Mathematics*, Level D. Read the instructions in the folder with the disk. Remember, if you need help or have an error, hold down the SHIFT key and press the ? key.

Print Alternative

2. Complete.

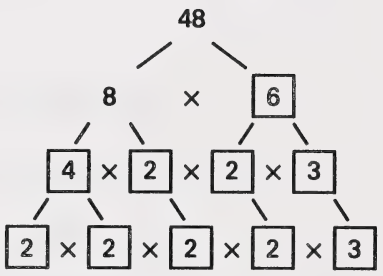
a.

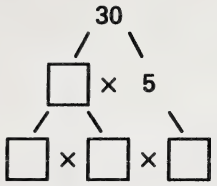


Suggested Answers

1. Computer checked.

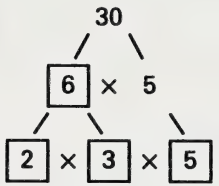
2. a.



b. 

c. 24 = □ × □ × □ × □

d. 75 = □ × □ × □

b. 

c. 24 = 2 × 2 × 2 × 3

d. 75 = 3 × 5 × 5

Guiding the Student

- Have the student read "Working Together" and do the Concluding Activities.
- Afterwards discuss the Concluding Activities.

DIVISIBILITY

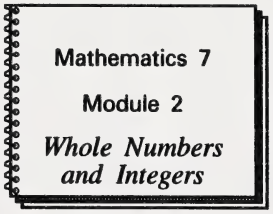
What Lies Ahead

In this section the student will learn this skill.

- deciding if a number is divisible by 2, 3, 4, 5, 6, 8, 9, or 10

Gathering Materials

For this section the student will need these items.



(Optional)

Computer Drill and Instruction: Mathematics, Level D (SRA)
"Numbers and Numeration"

Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 26 of the module booklet.
- Have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

Practice Activities

1. Which of these numbers is a multiple of 2?

   a. 7434
   b. 8259
   c. 15784
   d. 156432
   e. 24996
   f. 313277

2. Does each of these numbers have 3 as a factor?

   a. 6948

   b. 38117

   c. 938157

   d. 90928

   e. 85524

   f. 283146

Suggested Answers

1. Multiples of 2 are even numbers. The numbers are a, c, d, and e

2. a. Yes

   b. No

   c. Yes

   d. No

   e. Yes

   f. Yes

3. Does each of these numbers have 5 as a factor?

   a. 19 420

   b. 56 006

   c. 84 757

   d. 92 525

   e. 52 556

   f. 199 340

3. a. Yes

   b. No

   c. No

   d. Yes

   e. No

   f. Yes

4. Which numbers in Question 2 are divisible by 6?

4. None

5. s each of these numbers a multiple of 10?

   a. 888

   b. 2835

   c. 89 030

   d. 795 485

   e. 277 102

   f. 111 220

5. a. No

   b. No

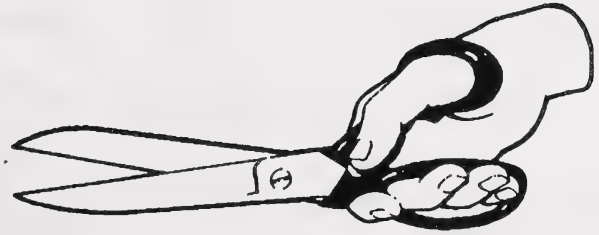
   c. Yes

   d. No

   e. No

   f. Yes

6. Nadine has a piece of material 35 m long to make Batik prints. Each Batik print requires 6 m of material. Can Nadine use all of the material? If not, how much is wasted?



6. $35 \div 6 = 5$ R5

Nadine cannot use all the material. 5 m of material is wasted.

Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- Afterwards, help the student check the answers and correct any errors.
- If the student had success with the Practice Activities, assign the Concluding Activities.
- Afterwards, check the answers and correct any errors.

Extra Practice

Computer Alternative

1. Do Lesson 13 of the disk "Numbers and Numeration" from the package *Computer Drill and Instruction: Mathematics*, Level D. Read the instructions in the folder with the disk. Remember, if you need help or have an error, hold down the SHIFT key and press the key.

Print Alternative

2. a. Add the digits in 521 361.

   b. Divide the sum by 3.

   c. What is the remainder?

   d. Is 521 361 divisible by 3?

   e. Is 521 361 divisible by 6? Why?

Suggested Answers

1. Computer checked.

2. a. $5 + 2 + 1 + 3 + 6 + 1 = 18$

   b. $18 \div 3 = 6$

   c. 0

   d. Yes

   e. No; It is not an even number. 521 361 is not divisible by 2.

3. In each of these cases is the remainder 0? Use the divisibility rules.

   a. 762 ÷ 10

   b. 2429 ÷ 3

   c. 798 ÷ 6

   d. 3336 ÷ 9

   e. 841 ÷ 2

   f. 6051 ÷ 5

3. a. No

   b. No

   c. Yes

   d. No

   e. No

   f. No

4. Name three 4-digit numbers that are divisible by 9.

4. Many possible answers. The sum of the four digits must be divisible by 9.

   Example: 3456

   3 + 4 + 5 + 6 = 18

   18 ÷ 9 = 2

Guiding the Student

- Have the student do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors.

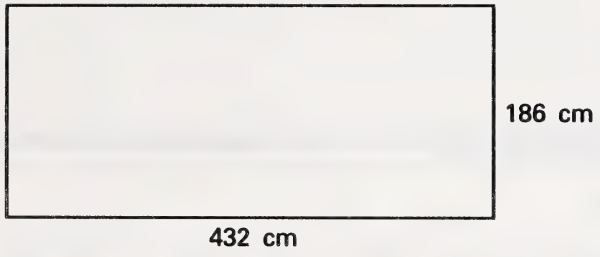
Concluding Activities

1. a. If a number is divisible by 2, 5, and 10, what must the last digit be?

   b. What do the divisibility tests for 3 and 9 have in common?

2. A number is divisible by 6 if it is divisible by 2 and 3. Try to discover a divisibility test for 15.

3. Mark has a pane of glass 186 cm by 432 cm. He wants to cut this pane of glass into rectangular pieces measuring 3 cm by 4 cm. Can he use all of the glass?



Suggested Answers

1. a. The number must end in a 0.

   b. The sum of the digits must be divisible by 9.

2. The number must be divisible by 3 and 5.

3. $186 \div 3 = 62$

   $432 \div 4 = 108$

   Yes, he can use all of the glass.

POWERS

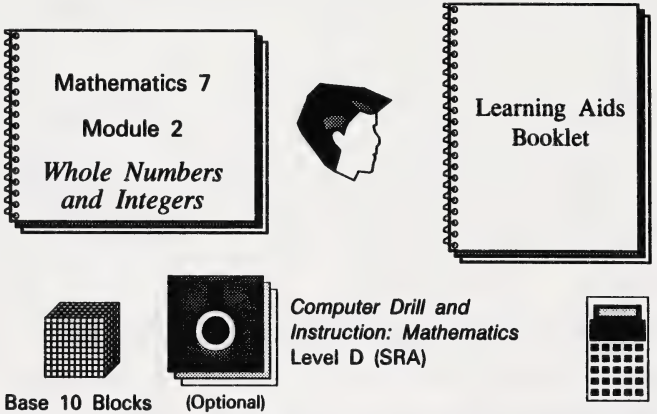
What Lies Ahead

In this section the student will learn these skills.

- recognizing numbers written as powers
- writing the value of a power
- writing standard numbers as powers

Gathering Materials

For this section the student will need these items.



Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 27 of the module booklet.
- Then have the student do the Learning Aids Activities (Exercise H in the *Learning Aids Booklet*) and check the answers. The suggested answers are in the appendix of that booklet.
- After the student has completed the Learning Aids Activities, have the student return to Section 27 in the module booklet Then read "Working Together" and do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

Practice Activities

1. Complete the table.

Suggested Answers

Power	Base	Exponent	Meaning	Standard Form
7^2	7	2	7×7	49
3^4	3	4	$3 \times 3 \times 3 \times 3$	81
4^3	4	3	$4 \times 4 \times 4$	64
6^2	6	2	6×6	36
10^5	10	5	$10 \times 10 \times 10 \times 10 \times 10$	100 000
8^3	8	3	$8 \times 8 \times 8$	512
5^3	5	3	$5 \times 5 \times 5$	125
2^6	2	6	$2 \times 2 \times 2 \times 2 \times 2 \times 2$	64

2. Express in standard form.

   a. nine squared
   b. two cubed
   c. sixth power of 10
   d. seven to the fourth power
   e. $(5 \times 10^3) + (3 \times 10^2) + (2 \times 10^1)$
   f. $(7 \times 10^3) + (8 \times 10^1) + (4 \times 1)$

2. a. $9^2 = 81$
   b. $2^3 = 8$
   c. $10^6 = 1\,000\,000$
   d. $7^4 = 2401$
   e. 5320
   f. 7084

3. Express as a power.

   a. 36
   b. 121
   c. 625
   d. 100

3. a. 6^2
   b. 11^2
   c. 5^4
   d. 10^2

4. Write in expanded form using powers.

   a. 289376

   b. 1574128

   c. 90576

4. a. $(2 \times 10^5) + (8 \times 10^4) + (9 \times 10^3) + (3 \times 10^2) + (7 \times 10^1) + (6 \times 1)$

   b. $(1 \times 10^6) + (5 \times 10^5) + (7 \times 10^4) + (4 \times 10^3) + (1 \times 10^2) + (2 \times 10^1) + (8 \times 1)$

   c. $(9 \times 10^4) + (5 \times 10^2) + (7 \times 10^1) + (6 \times 1)$

Guiding the Student

- If the student had difficulty with the Practice Activities, assign the Extra Practice.
- Afterwards, help the student check the answers and correct any errors.
- If the student had success with the Practice Activities, have the student read "Working Together" and do the Concluding Activities.
- Afterwards, check the answers and correct any errors.

Extra Practice

Computer Alternative

1. Do Lessons 9 and 10 of the disk "Numbers and Numeration" from the package *Computer Drill and Instruction: Mathematics,* Level D. Read the instructions in the folder with the disk before using the program. If you need help or have an error hold down the SHIFT key and press the [?] key.

Print Alternative

2. Which number is the exponent? Which number is the base?

   a. 2^4

   b. 9^3

   c. 5^2

   d. 3^5

   e. 10^4

   f. 6^2

Suggested Answers

1. Computer checked.

		Exponent	Base
2.	a.	4	2
	b.	3	9
	c.	2	5
	d.	5	3
	e.	4	10
	f.	2	6

3. Express the number as a power.

a. $2 \times 2 \times 2 \times 2$

b. $6 \times 6 \times 6$

c. $3 \times 3 \times 3$

d. 10×10

e. $7 \times 7 \times 7 \times 7 \times 7$

3. a. 2^4

b. 6^3

c. 3^3

d. 10^2

e. 7^5

4. Write the number in standard form.

a. 5^2

b. 5^3

c. 5^4

d. the sixth power of 5

4. a. $5 \times 5 = 25$

b. $5 \times 5 \times 5 = 125$

c. $5 \times 5 \times 5 \times 5 = 625$

d. $5^6 = 5 \times 5 \times 5 \times 5 \times 5 \times 5 = 15625$

5. Fill in the blanks. One has been done as an example.

a. $27 = _____ \times _____ \times _____ = _____$

b. $64 = 4 \times 4 \times 4 = _____$

c. $1000 = _____ \times _____ \times _____ = _____$

d. $4096 = 8 \times 8 \times 8 \times 8 = _____$

5. a. $27 = 3 \times 3 \times 3 = 3^3$

b. $64 = 4 \times 4 \times 4 = 4^3$

c. $1000 = 10 \times 10 \times 10 = 10^3$

d. $4096 = 8 \times 8 \times 8 \times 8 = 8^4$

6. Expanded form uses powers of 10. Write the standard form.

a. $(8 \times 10^4) + (9 \times 10^3) + (3 \times 10^1)$

b. $(4 \times 10^3) + (5 \times 10^2) + (6 \times 10^1) + (7 \times 1)$

6. a. 89030

b. 4567

Guiding the Student

- Have the student read "Working Together" and do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors.

Concluding Activities

1. Evaluate the following on paper. Then use your calculator to get the same answer.

   a. 7^2

   b. 158^2

   c. 5^3

   d. 25^4

   e. 4^6

2. A number that can be written with an exponent of 2 is called a square. For example, 36 is a square because it can be expressed as 6^2. List 5 other squares.

Suggested Answers

1. a. $7 \times 7 = 49$

   b. $158 \times 158 = 24964$

   c. $5 \times 5 \times 5 = 125$

   d. $25 \times 25 \times 25 \times 25 = 390625$

   e. $4 \times 4 \times 4 \times 4 \times 4 \times 4 = 4096$

2. There are many possible answers. These are but a few.

   $64 = 8^2$

   $81 = 9^2$

   $100 = 10^2$

   $121 = 11^2$

   $144 = 12^2$

3. There are many different expressions for 81. Here are a few.

3×27	$243 \div 3$
9×9	$405 \div 5$
$45 + 36$	9^2
$40 + 41$	3^4
$85 - 4$	$8^2 + 17$
$100 - 19$	$10^2 - 19$

Give 10 different expressions for 16. (Some of the expressions should include powers.)

3. There are many possible answers. These are but a few.

a. $20 - 4$
b. 4^2
c. 2^4
d. $3^2 + 7$
e. $2^6 \div 2^2$
f. $2^2 \times 2^2$
g. $12 + 4$
h. $32 \div 2$
i. $128 \div 8$
j. 2×2^3

RECOGNIZING INTEGERS

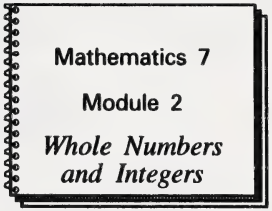
What Lies Ahead

In this section the student will learn this skill.

- interpreting integers

Gathering Materials

For this section the student will need these items.



(Optional)

Computer Drill and Instruction: Mathematics, Level D (SRA) "Pre-Algebra"

Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 28 of the module booklet.
- Have the student do the Practice Activities.
- Afterwards help the student check the answers and correct any errors.

Practice Activities

Computer Alternative

1. Do Lessons 11 and 12 of the "Pre-Algebra" disk in the SRA *Computer and Instruction: Mathematics,* Level D package. Read the instructions in the folder with the disk. Remember to hold down the SHIFT key and press the ? key when you need help or have a question.

Print Alternative

2. Write the positive or negative number for each of the following situations.

   a. 5°C below freezing
   b. 1 floor below ground level
   c. 30 m above sea level
   d. 3 extra points
   e. 6 steps in front of
   f. 50 m below sea level
   g. 6 paces behind
   h. 1 under par

Suggested Answers

1. Computer checked.

2. a. −5
   b. −1
   c. +30 or 30
   d. +3 or 3
   e. +6 or 6
   f. −50
   g. −6
   h. −1

3. In a game, Dennis scored 28 points and Eileen scored 15. Jim lost 25 points and Theresa lost 13. Represent the scores with positive and negative numbers.

3. +28 or 28, +15 or 15, −25, −13

4. Kathy uses positive numbers to represent money she receives each week. She uses negative numbers for money she needs to spend. Write the number Kathy uses for each of these cases.

   a. babysitting: $10
   b. entertainment: $4
   c. snacks: $3
   d. allowance: $5
   e. music tape: $8

4. a. +10 or 10
   b. −4
   c. −3
   d. +5 or 5
   e. −8

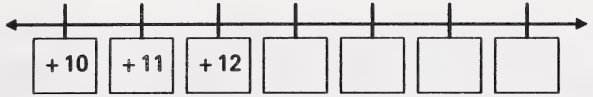
5. Name the pair of opposites that are included in each of these lists.

   a. +400, +40, −4, +4
   b. +17, +7, −17, +71

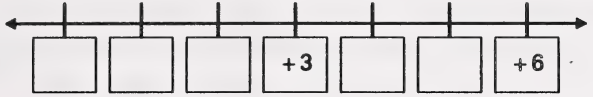
5. a. −4, +4
   b. +17, −17

6. Complete each number line by putting an integer in each box.

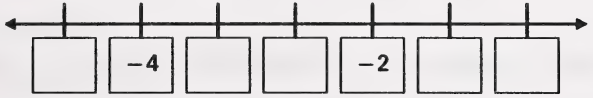
a.



b.



c.



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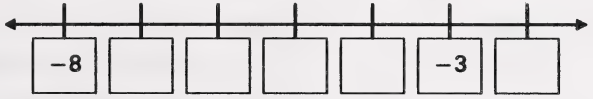

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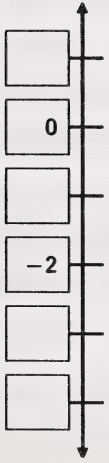
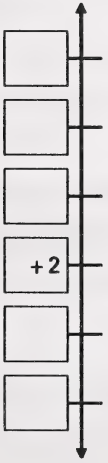


f.



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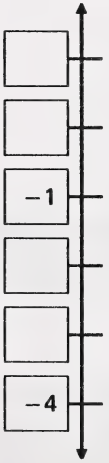

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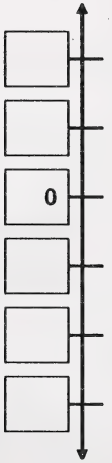
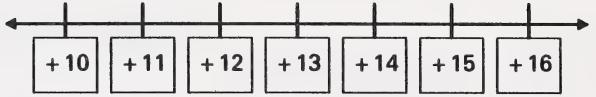


6. a.



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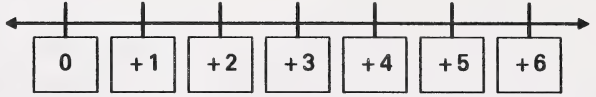

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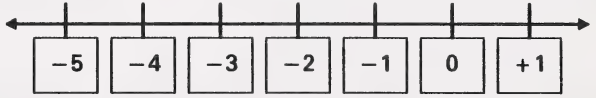

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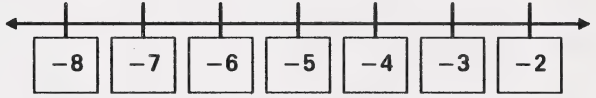

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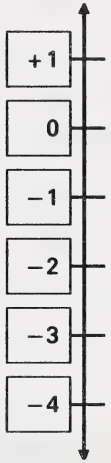

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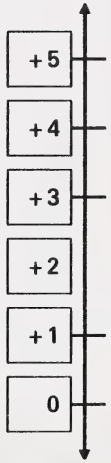

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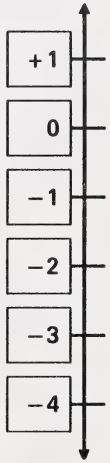

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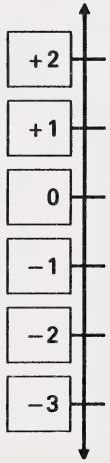
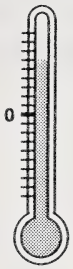
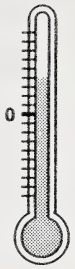


7. A thermometer is really a vertical number line. What is the temperature in degrees Celsius on each of these thermometers?

a. 

b. 

c.

d.

e.

7. a. +6°C or 6°C
   b. +4°C or 4°C
   c. −7°C
   d. −1°C
   e. 0°C

8. Use > or < to make a true statement for each of these.

a. +6 ◯ +1

b. −5 ◯ +2

c. −6 ◯ −2

d. +1 ◯ −2

e. −2 ◯ −6

f. −2 ◯ +8

8. a. >
   b. <
   c. <
   d. >
   e. >
   f. <

9. Arrange each group of integers from least to greatest.

   a. $+2, -1, 0, +7, -5$

   b. $-7, +1, -4, +3, +2$

9. a. $-5, -1, 0, +2, +7$

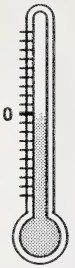
   b. $-7, -4, +1, +2, +3$

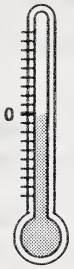
Guiding the Student

- Have the student do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors.

Concluding Activities

1. Compare the thermometers below with the thermometer directly to the right. Did the temperature increase or decrease in each case? How much?



a.


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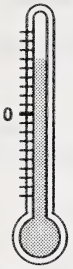
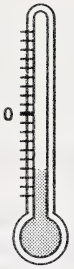


c.


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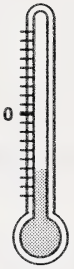

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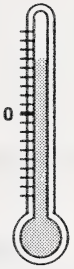


Suggested Answers

1. a. 0

   b. +6

   c. −6

   d. −6

   e. +6

2. **Longitude** is distance, in degrees, east or west on the Earth's surface.

   Earth rotates once or goes through or 360° every 24 hours. Therefore each 15° zone around the globe has a difference of 1 hour in time.

   Greenwich, England, has longitude 0°. The time for places in the zone 30° west of Greenwich is 2 hours earlier. The time for places in the zone 45° east of Greenwich is 3 hours later.

   The following map shows the approximate location of the 24 time zones. The numbers indicate clock changes earlier or later than Greenwich time.

   Give the time change for each distance as a positive or negative number.

   a. London to Sydney
   b. London to Halifax
   c. New Delhi to Tokyo
   d. Tokyo to Rio de Janeiro
   e. Edmonton to Cape Town
   f. Halifax to Buenos Aires

2. a. +10
   b. −4
   c. +4
   d. −12
   e. +8
   f. 0

ADDING INTEGERS

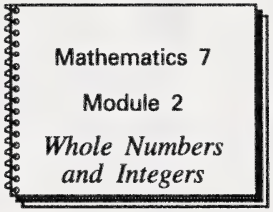
What Lies Ahead

In this section the student will learn these skills.

- adding integers using learning aids
- adding integers using number lines

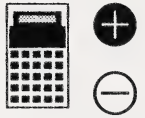
Gathering Materials

For this section the student will need these items.



(Optional)

Computer Drill and Instruction: Mathematics, Level D (SRA)
"Pre-Algebra"



Guiding the Student

- Have the student read the "What Lies Ahead" box and "Working Together" in Section 29 of the module booklet.
- Have the student do the Introductory Activities.
- Afterwards help the student check the answers and correct any errors.

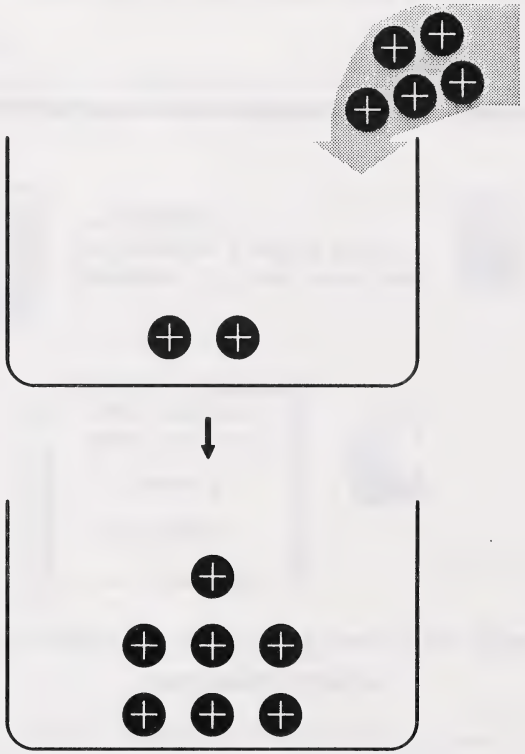
Introductory Activities

1. Use the counters at the end of this section (or use checkers or two-coloured bingo chips) to model these sums.

   a. (+2) + (+5) = _____

Suggested Answers

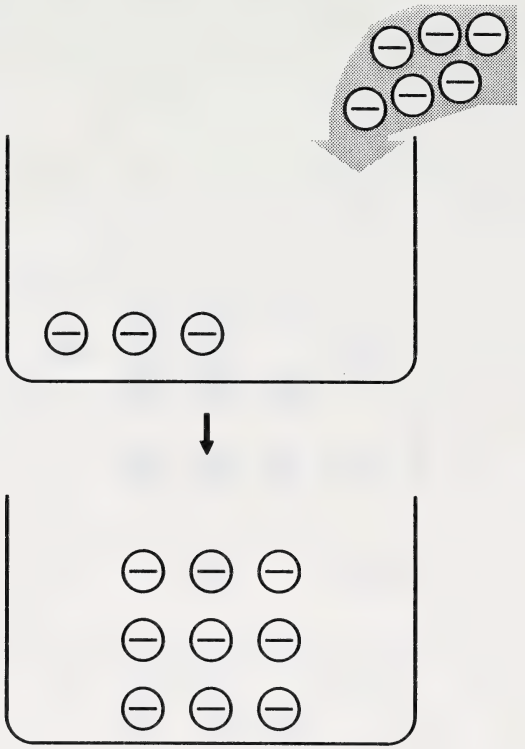
1. a.



(+2) + (+5) = +7

b. $(-3) + (-6) =$ _____

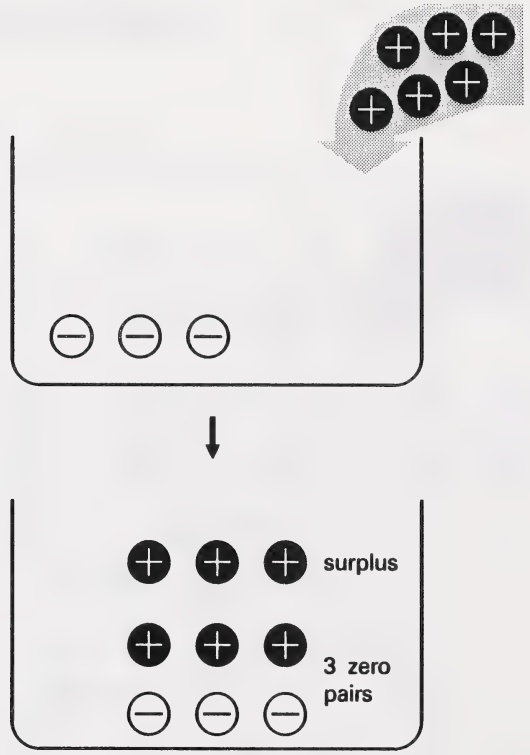
b.



$(-3) + (-6) = -9$

c. $(-3) + (+6) =$ _____

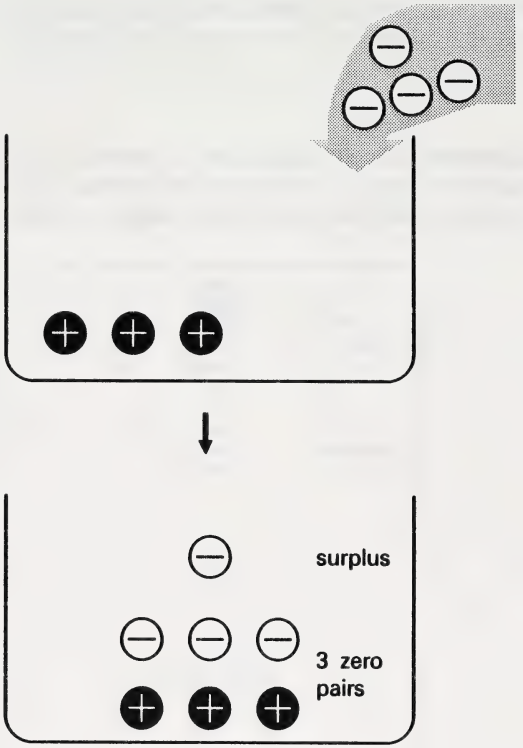
c.



$(-3) + (+6) = +3$

d. $(+3) + (-4) =$ _____

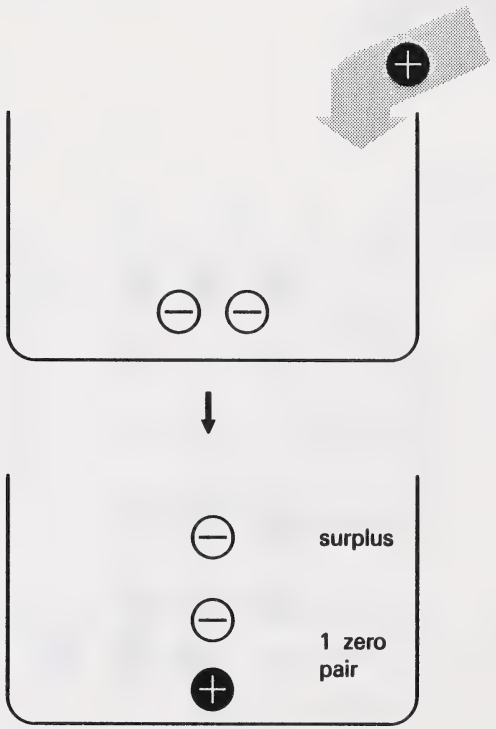
d.



$(+3) + (-4) = -1$

e. $(-2) + (+1) =$ _____

e.



$(-2) + (+1) = -1$

2. a. What pattern occurs when you add counters with like signs?

   b. What pattern occurs when you add counters with unlike signs?

2. a. The number in the answer is the **sum** of the counters, and the answer has the **same sign** as the counters.

   b. The number in the answer is the **difference** between the positive and negative counters, and the answer has the same sign as the **surplus** counters.

3. Use the patterns in question 2 to predict the following sums.

   a. $(+7) + (+1)$

   b. $(-3) + (-6)$

   c. $(-4) + (+9)$

   d. $(+2) + (-2)$

   e. $(-6 + (+3)$

3. a. $+8$

   b. -9

   c. $+5$

   d. 0

   e. -3

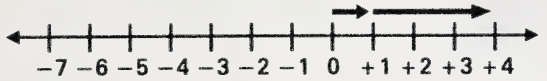
Guiding the Student

- Have the student read "Working Together" and do the Practice Activities.
- Afterwards, help the student check the answers and correct any errors.

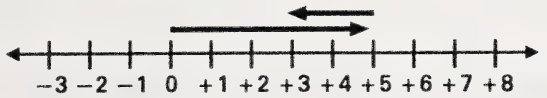
Practice Activities

1. Write the addition sentence suggested by the arrow on the number line.

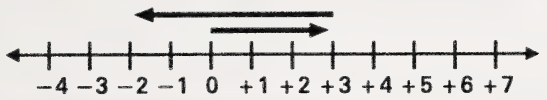
a.



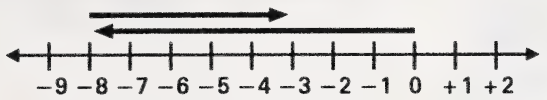
b.



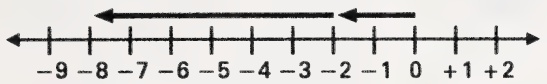
c.



d.



e.



Suggested Answers

1. a. $(+1) + (+3) = +4$

b. $(+5) + (-2) = +3$

c. $(+3) + (-5) = -2$

d. $(-8) + (+5) = -3$

e. $(-2) + (-6) = -8$

2. Use arrows on a number line to show these sums.

a. (+5) + (+2)

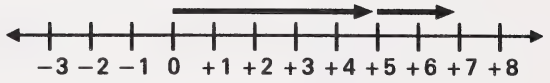
b. (−2) + (−3)

c. (−1) + (−1)

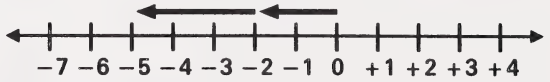
d. (−6) + (+5)

e. (+4) + (−4)

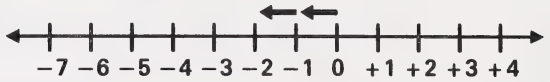
2. a.



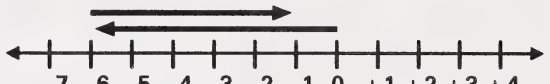
b.



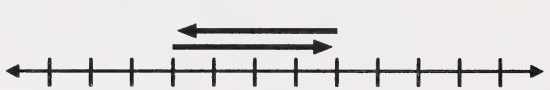
c.



d.



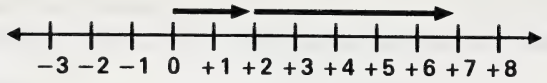
e.



3. Draw a number line to show the events.

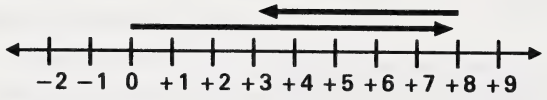
a. a growth of 2 cm followed by a growth of 5 cm

3. a.

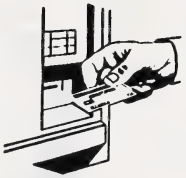


b. a temperature rise of 8°C followed by a drop of 5°C

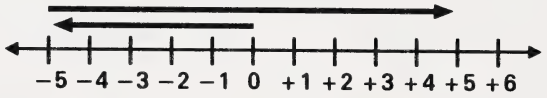
b.



c. a withdrawal of $5 followed by deposit of $10



c.



4. Write a number sentence describing the events in question 3 above. Give the correct answer.

4. a. (+2) + (+5) = +7

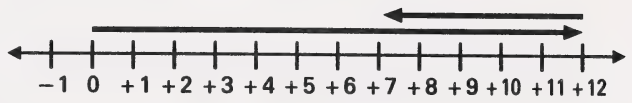
b. (+8) + (−5) = +3

c. (−5) + (+10) = +5

5. Solve. Show a number sentence for each problem.

a. The temperature at 3 o'clock was 12°C. By 9 o'clock it had fallen 5°C. What was the temperature at 9 o'clock?

5. a.

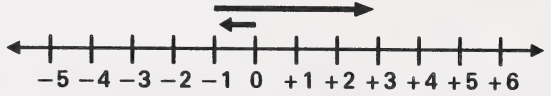


(+12) + (−5) = +7

The temperature was 7°C.

b. Colonel Bogey scores −1 on his first hole of golf and +4 on the next. What is his score after the two holes have been played?

b.

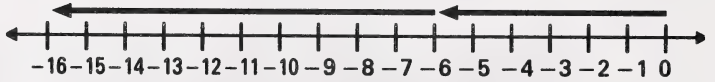


(−1) + (+4) = +3

His score was +3.

c. Felina lost 6 marbles in one game and then lost 10 more in another game. What was her total loss?

c.



(−6) + (−10) = −16

Her total was a loss of 16 marbles.

Guiding the Student

- Have the student do the Concluding Activities.
- Afterwards help the student check the answers and correct any errors.

Concluding Activities

Complete the following Magic Square.

Remember that in a magic square every row, column, and diagonal must add to the same number.

−4	17	2
11	5	−1
8	−7	14

Suggested Answers

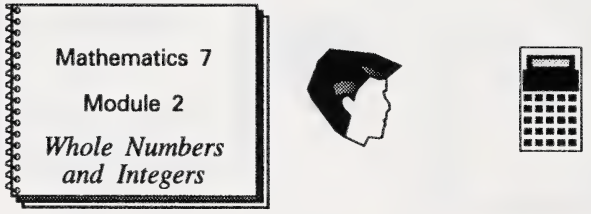
SUMMARY

What Lies Ahead

In this summary the student will review the skills taught in Part Three.

Gathering Materials

For this section the student will need these items.



Guiding the Student

- Have the student turn to Section 30 in the module booklet and reveiw the skills taught in Part Three.
- Then have the student turn to Section 21 to review the pretest and to correct any errors.

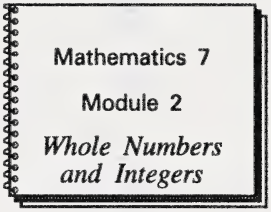
MODULE CONCLUSION

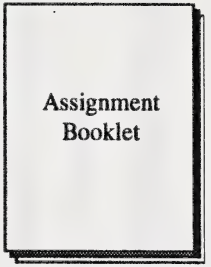
What Lies Ahead

The student is now ready to do the assignment in the assignment booklet. The student will be graded on the work done in this booklet.

Gathering Materials

The student will need the following items.





Base 10 Blocks

Guiding the Student

- Have the student complete the assignment independently. The student may use resource material, but cannot get help. The student should attempt all parts of the assignment.
- Afterwards, give the student feedback and a grade. Suggested answers are provided on the next few pages of this booklet.

Suggested Answers to Assignment Booklet

30

Part 1: Multiple Choice Questions

Each of the following questions has four suggested answers: one of which is better than the others. Select the best answer and indicate your choice by writing the letter in the blank on the response page at the right.

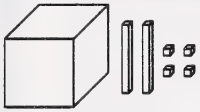
2 1. The value of the 2 in the number 673 290 541 is

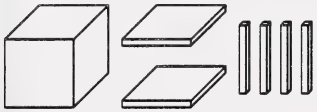
a. 200
b. 20 000
c. 200 000
d. 2 000 000

2 2. The number (5 × 10 000) + (2 × 1000) + (6 × 100) + (8 × 1) written in standard form is

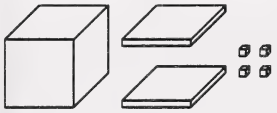
a. 52 608
b. 5 268
c. 520 068
d. 52 680

2 3. Form the number 1204 with base 10 blocks. It looks like

a. 

b. 

c.

d. 

2 4. The number 30 568 rounded to the nearest thousand is

a. 31 000
b. 30 000
c. 30 600
d. 31 568

Part 1 Response Page

1. c

2. a

3. d

4. a

Part 1 (continued)

2 5. The correct method of finding the sum of 127 and 51 mentally is

a. (130 + 50) − 3
b. (130 + 51) − 1
c. (127 + 50) + 1
d. (130 + 51) + 3

2 6. The most accurate estimate of the difference of 710 and 298 is

a. 300
b. 350
c. 400
d. 500

2 7. The most accurate estimate of the quotient of 43 012 and 591 is

a. 700
b. 80
c. 800
d. 70

2 8. The value of $\frac{24 \div 4 + 2}{2 + 1 \times 2}$ is

a. 1
b. 2
c. 6
d. 8

2. 9. 63 is a multiple of

a. 2
b. 4
c. 7
d. 8

2 10. Which number is a prime number?

a. 51
b. 49
c. 20
d. 17

Part 1 Response Page (continued)

5. c

6. c

7. d

8. b

9. c

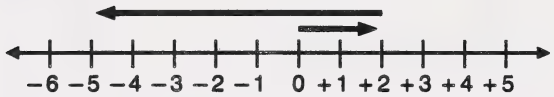
10. d

Part 1 (continued)

2 11. Which statement is false?

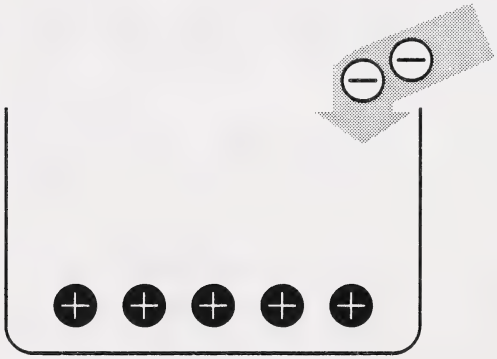
a. $-4°C$ is warmer than $-8°C$
b. $0°C$ is colder than $-5°C$
c. $+10°C$ is warmer than $-2°C$
d. $+6°C$ is colder than $+7°C$

2 12. Which number sentence is shown by this number line?



a. $(-6) + (+8) = +2$
b. $(-5) + (+7) = +2$
c. $(+2) + (-7) = -5$
d. $(-5) + (-7) = +2$

2 13. Which number sentence is shown by this model?



a. $(+5) + (-2) = +3$
b. $(+5) + (-2) = -3$
c. $(+5) + (-2) = +7$
d. $(+5) + (-2) = -7$

Part 1 Response Page (continued)

11. b

12. c

13. a

Part 1 (continued)

2 14. The opposite of -2 is

a. -2
b. $+4$
c. $+2$
d. 0

2 15. Which list shows these numbers in order from smallest to largest?

$+1, -6, 0, -4, +5$

a. $-4, -6, 0, +1, +5$
b. $0, -4, -6, +1, +5$
c. $-6, -4, 0, +1, +5$
d. $0, -6, -4, +1, +5$

Part 1 Response Page (continued)

14. ___c___

15. ___c___

Total for Part 1 = _____ (maximum possible: 30 marks)

80

Part 2: Short-Answer Questions

When answering the following questions show all necessary steps and give complete answers. Put your answers in the spaces provided on the response page.

2 1. Write the number 8 075 620 in expanded notation.

1 2. Write the number forty thousand three hundred ninety-two in standard form.

1 3. Arrange the numbers from least to greatest

834, 384, 843, 583, 1034, 835

4. Calculate the following mentally. Explain how you obtained each answer.

2 a. $18 + 4 + 2 + 6$

2 b. $25 \times 17 \times 4$

2 c. $72\,000 \div 90$

2 d. $459 + 327$

Part 2 Response Page

1. $(8 \times 1\,000\,000) + (7 \times 10\,000) + (5 \times 1000) + (6 \times 100) + (2 \times 10)$

2. 40 392

3. 384, 583, 834, 835, 843, 1034

4. a. 30

   Rearrange addends looking for friendly numbers.

   $(4 + 6) + (18 + 2) = 10 + 20 = 30$

   b. 1700

   Rearrange factors looking for friendly numbers.

   $(25 \times 4) \times 17 = 100 \times 17 = 1700$

   c. 800

   Cancel zeros, divide front digits and add appropriate number of zeros.

   $7200 \div 9 = 72 \div 9 + 2$ zeros $= 800$

   d. 786

   Add 1 to 459 and subtract 1 from 327 which is the Plus-Minus Method.

   $460 + 326 + 786$

Part 2 (continued)

2 4. e. 471 − 239

2 f. 499 × 5

5. Write an estimate for each of the following. Explain how you obtained each estimate.

2 a. 384 + 791

2 b. 5213 − 879

2 c. 315 × 87

2 d. 1723 ÷ 3

Part 2 Response Page (continued)

4. e. 232

Add 1 to 471 and add 1 to 239 which is the Addition Method.

$472 - 240 = 232$

f. 2495

Add 1 to 499 and subtract 5.

$500 \times 5 - 1 \times 5 = 2500 - 5 = 2495$

5 Answers will vary. Methods include rounding, front-end digits, and friendly numbers. Below are possible answers.

a.

$$\begin{array}{r} 384 \longrightarrow 400 \\ +\ 791 \longrightarrow 800 \\ \hline 1200 \end{array}$$

Rounding

OR

3	84
7	91
10	00

Front-End Digits

b.

$$\begin{array}{r} 5213 \longrightarrow 5200 \\ -\ 879 \longrightarrow 900 \\ \hline 4300 \end{array}$$

Rounding

52	13
8	79
44	00

Front-End Digits

c.

$$\begin{array}{r} 315 \longrightarrow 300 \\ \times\ 87 \longrightarrow 100 \\ \hline 30000 \end{array}$$

Rounding

31	5
8	7
240	00

Front-End Digits

d. $1723 \div 3 = 1800 \div 3 = 600$

friendly numbers

Part 2 (continued)

4 6. Explain the meaning of 21 ÷ 3. Accompany your explanation with a diagram.

7. Evaluate the following using paper and pencil methods. Show your calculations.

2 a. 42 332 + 895 + 3 706

2 b. 16 000 − 7 852

2 c. 592 × 46

2 d. 211 188 ÷ 22

Part 2 Response Page (continued)

6. 21 ÷ 3 can mean in 21 there are 3 groups of how many.

21 ÷ 3 = 7

OR

21 ÷ 3 can mean in 21 there are how many groups of 3.

21 ÷ 3 = 7

7. a.
$$\begin{array}{r} {\scriptstyle 1\ \ 1\ \ 1\ \ \ \ } \\ 4\,2\,3\,3\,2 \\ \quad\ 8\,9\,5 \\ \quad 3\,7\,0\,6 \\ \hline 4\,6\,9\,3\,3 \end{array}$$

b.
$$\begin{array}{r} 16\,000 \\ -\ 7\,852 \\ \hline 8\,148 \end{array}$$

c.
$$\begin{array}{r} 592 \\ \times\ 46 \\ \hline 3\,552 \\ 23\,68\ \ \\ \hline 27\,234 \end{array}$$

d.
$$\begin{array}{r} 9\,599\ \text{R10} \\ 22\overline{)\,211\,188} \\ \underline{198\ \ \ \ \ \ } \\ 131\ \ \ \ \ \\ \underline{110\ \ \ \ \ } \\ 218\ \ \ \ \\ \underline{198\ \ \ \ } \\ 208\ \ \ \\ \underline{198\ \ \ } \\ 10 \end{array}$$

Part 2 (continued)

8. Use a calculator to find the answer.

1 a. 27 660 200 + 69 175 345

1 b. 2467 × 381

9. Round the following to the nearest hundred.

1 a. 4 378

1 b. 17 841

1 c. 953

10. Evaluate the following. Show your work.

2 a. 20 − 8 ÷ 4

2 b. (8 + 4) ÷ 12 + 2

3 11. Write the first three multiples of 6.

2 12. Write two common multiples of 8 and 20. Show your work.

Part 2 Response Page (continued)

8. a. 96 835 545

   b. 939 927

9. a. 4400

   b. 17 800

   c. 1000

10. a. $20 - 8 \div 4$
    $= 20 - 2$
    $= 18$

    b. $(8 + 4) \div 12 + 2$
    $= 12 \div 12 + 2$
    $= 1 + 2$
    $= 3$

11. 6, 12, 18

12. 8, 16, 24, 32, (40), 48, 56, 64, 72, (80)

    20, (40), 60, (80)

Part 2 (continued)

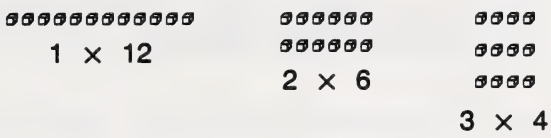
3 13. List all the factors of 12 and use diagrams to show the factors.

3 14. Find the common factors of 45 and 60. Show your work.

2 15. Is 33 a prime number? Why or why not?

2 16. Construct a factor tree to show the prime factorization of 42.

Part 2 Response Page (continued)

13. 

The factors of 12 are 1, 2, 3, 4, 6, and 12.

14. Factors of 45 are 1, (3), (5), 9, (15), 45

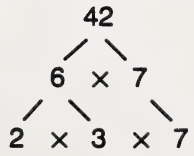
Factors of 60 are 1, 2, (3), 4, (5), 6, 10, 12, (15), 20, 30, 60

Common factors are 3, 5, and 15.

15. No

Factors of 33 = 1, 3, 11, 33.

A prime number has only 2 factors which are 1 and the number itself.

16. 

Part 2 (continued)

17. Is the number 619 320 divisible by the following? Explain why or why not without calculating.

1 a. 2

1 b. 3

1 c. 4

1 d. 5

2 18. = 5

Use diagrams to show 5^2 and 5^3.

2 19. Evaluate 3^4.

2 20. Write 1000 as a power.

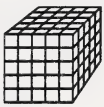
Part 2 Response Page (continued)

17. a. Yes. 619 320 ends in an even digit.

    b. Yes. The sum of the digits is divisible by 3.

    c. Yes. The last 2 digits are divisible by 4.

    d. Yes. 619 320 ends in 0.

18. $5^2 = 25$  $5^3 = 125$

19. $3^4 + 3 \times 3 \times 3 \times 3 = 81$

20. $1000 = 10 \times 10 \times 10 = 10^3$

Part 2 (continued)

2 21. Write the number which is the opposite of -7.

2 22. Write the numbers below in order from greatest to least.

$+1,\ -3,\ 0,\ -4,\ +3$

23. Find the sum using counters.

2 a. $(-3) + (+8)$

2 b. $(-10) + (-6)$

2 c. $(+2) + (+7)$

Part 2 Response Page (continued)

21. +7

22. +3, +1, 0, −3, −4

23. a. +5

b. −16

c. +9

Total for Part 2 = _____ (maximum possible: 80 marks)

50

Part 3: Problems

When answering the following questions, show your calculations, and give the answers in sentences.

1 1. A hockey player is reported to be making a "six-digit" yearly salary. Write, in standard form, the smallest possible amount of money the player would make in a year.

2 2. Use brackets to make the following a true statement.

$$54 - 36 \div 6 + 3 = 6$$

8 3. Fill in the missing numbers.

a.

$$\begin{array}{r} \square\ 3\ \square \\ +\ 6\ \square\ 4 \\ \hline 1\ 3\ 1\ \square \end{array}$$

b.

$$\begin{array}{r} \square\ 6\ 9 \\ \times\ \ 3\ \square \\ \hline 1\ \square\ 8\ 3 \\ 8\ \square\ 7\ \ \\ \hline 9\ 9\ 5\ 3 \end{array}$$

4. An "Orchids of the Americas" show was organized in Edmonton. The chart gives the number of orchids shown by the participating countries.

	Country	Number of Species
North America	Canada	48
	United States	105
	Mexico	66
Central America	Guatemala	60
	Costa Rica	71
South America	Venezuela	97
	Brazil	124

2 a. How many orchids came from Central America?

2 b. How many more orchids were from Brazil than from Mexico?

3 c. Were more orchids shown by the combined North American countries or by the combined South American countries? How many more?

Part 3 Response Page

1. $999 999 is the most that could be earned by this hockey player.

2. $(54 - 36) \div 6 + 3 = 6$

3. a.

$$\begin{array}{r} \boxed{6}\ 3\ \boxed{9} \\ +\ 6\ \boxed{7}\ 4 \\ \hline 1\ 3\ 1\ \boxed{3} \end{array}$$

b.

$$\begin{array}{r} \boxed{2}\ 6\ 9 \\ \times\ \ 3\ \boxed{7} \\ \hline 1\ \boxed{8}\ 8\ 3 \\ 8\ \boxed{0}\ 7 \\ \hline 9\ 9\ 5\ 3 \end{array}$$

4 a. $60 + 71 = 131$ 131 orchids came from Central America.

b. $124 - 66 = 58$ 58 more orchids came from Brazil than from Mexico.

c. $48 + 105 = 153$

$124 + 97 = 221$

$221 - 153 = 68$ 68 more orchids came from South America than from North America.

Part 3 (continued)

5. At an art show, there are 38 display boards for paintings.

3 a. If 6 paintings are put on each board, how many paintings can be displayed?

3 b. The show has 190 paintings, and all the display boards are used. How many paintings are on each board?

3 6. A golf ball factory made 26 875 golf balls in one week. **Estimate** how many packages of 3 balls each were made. (Show your estimations.)

Note: Use a calculator for Question 7. Do not write the calculations.

7. One week a newspaper sold the following numbers of copies:

Monday	75 218
Tuesday	72 560
Wednesday	73 704
Thursday	74 196
Friday	75 010
Saturday	77 452
Sunday	76 335

3 a. Find the total number of copies sold that week.

3 b. Use the total number sold in the week to predict how many copies might be sold in a year if 1 year = 52 weeks.

3 8. **Make up** a problem for which the following statement is the answer.

There are 1200 seats in the theatre. (Use a calculator to help if you wish.)

3 9. What 3 numbers have these characteristics?

- 3 is a factor
- 4 is not a factor
- 60 is a multiple

Part 3 Response Page (continued)

5. a. A total of 288 paintings can be displayed on 38 display boards.

$$\begin{array}{r} 38 \\ \times\ 6 \\ \hline 288 \end{array}$$

b. There were 5 paintings arranged on each display board.

$$\begin{array}{r} 5 \\ 38\overline{)190} \\ \underline{190} \end{array}$$

6. $26\,875 \div 3 \doteq 27\,000 \div 3 \doteq 9\,000$

About 9 000 packages of 3 golf balls each were made.

7. a. In all 524 475 newspapers were sold during this particular week.

b. About 27 272 700 newspapers would be sold in 1 year.

8. Answers will vary.

9. 6, 15, and 30 are the three numbers.

Part 3 (continued)

2 10. Find the smallest whole number which gives a remainder of 1 when divided by 3, 5, and 7.

3 11. Robbie's 2 pet yoogleenoids are reproducing in an **exponential** way. That is, on day 1 there are 2^1 yoogleenoids, on day 2 there are 2^2 yoogleenoids, on day 3 there are 2^3 yoogleenoids, and so on. In how many days, counting day 1, will Robbie have at least 1000 yoogleenoids?

3 12. Find a prime number which is the sum of two composite numbers. Write the composite numbers as well as the prime number.

3 13. The temperature at 7 a.m. was $-10°C$. By noon the temperature had risen $+6°C$. What was the temperature at noon?

Part 3 Response Page (continued)

10. 106 is the smallest number possible which meets the specified conditions.

$$\begin{array}{r} 35 \\ 3\overline{)106} \\ \underline{9} \\ 16 \\ \underline{15} \\ 1 \end{array} \qquad \begin{array}{r} 21 \\ 5\overline{)106} \\ \underline{10} \\ 6 \\ \underline{5} \\ 1 \end{array} \qquad \begin{array}{r} 15 \\ 7\overline{)106} \\ \underline{7} \\ 36 \\ \underline{35} \\ 1 \end{array}$$

11.

day 1	day 2	day 3	day 4	day 5
$2^1 = 2$	$2^2 = 4$	$2^3 = 8$	$2^4 = 16$	$2^5 = 32$
day 6	**day 7**	**day 8**	**day 9**	**day 10**
$2^6 = 64$	$2^7 = 128$	$2^8 = 256$	$2^9 = 512$	$2^{10} = 1024$

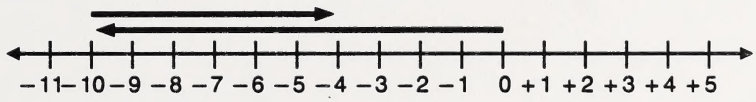
Robbie will have at least 1000 yoogleenoids on the tenth day.

12. 17 is the prime number.

8 and 9 are the composite numbers.

There are many other examples such as 31 = 27 + 4 where 31 is a prime number and 27 and 4 are composite numbers.

13.



$(-10) + (+6)$
$= -4$

The temperature at noon was $-4°C$.

Total for Part 3 = _____ (maximum possible: 50 marks)

N.L.C. - B.N.C.
3 3286 10809696 3

This booklet cannot be purchased separately; the Learning Facilitator's Manual for Mathematics 7 is available only as a complete set.

Mathematics 7

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